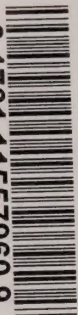


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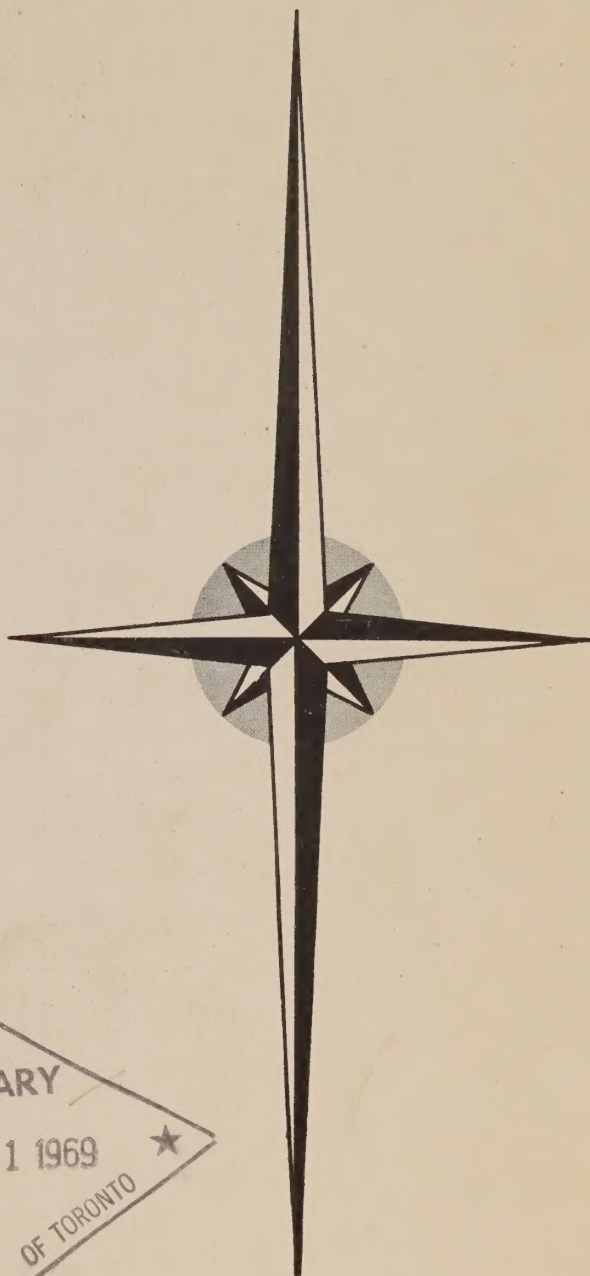
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Northern Survival

Government
Publications



Canada

EDUCATION DIVISION
Northern Administration Branch
Department of Indian Affairs
and Northern Development

NORTHERN SURVIVAL

VOCATIONAL EDUCATION SECTION
EDUCATION DIVISION
NORTHERN ADMINISTRATION BRANCH
DEPARTMENT OF INDIAN AFFAIRS
AND NORTHERN DEVELOPMENT
OTTAWA

Rep. March, 1968.
Rep. January, 1969.

Queen's Printer Ottawa, 1969

Cat. No.: R72-5169



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NORTHERN SURVIVAL



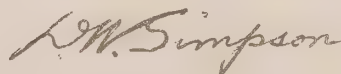
The HUB of the NORTH

FOREWORD

"Northern Survival" is another resource booklet in the series which comprise the publication "Practical Programs in Industrial Arts and Related Activities". While much of the information can be labelled as common sense it must be remembered that in various situations the inability to apply commonly known survival principles under stress has led to the deaths of many able, apparently knowledgeable people.

This unit adds a new area of instruction in which the school can assist pupils to develop native skills and an appreciation of the resources of the north. Every effort should be made to maintain a very close contact with the local environment. The entire purpose of these units is to bridge the gap between school and life on the land. We must therefore, be certain that life on the land is as we depict it.

This resource booklet has been produced through the efforts of Mr. H.A. Macdonald, Curriculum Specialist and Mr. J.L. Caverhill, Industrial Arts Supervisor. Special thanks is given to Mr. G.J. Rancier, Head of the Vocational Education Section, who proof read the work and offered many valuable suggestions.



D. W. Simpson,
Chief, Education Division

NORTHERN SURVIVAL

Introduction

Travel in the north as elsewhere has undergone extensive and dramatic changes in recent years. Long distances are covered by aircraft, and the romantic but archaic dog sled is being replaced by skidoos, bombadiers and other power-driven over-snow vehicles. The increase in the number of people travelling has made skill in map reading and basic direction-finding even more valuable in this environment than in the south.

This material like that contained in the other sections in this supplement is intended simply as resource material to be used by teachers in an effort to spark further ideas and research into suitable units of work for use in our schools.

Equipment and Supplies

The remarks contained in the original edition of "Practical Programs in Industrial Arts and Related Activities" apply to this course also.

Resource Personnel

Every effort should be made to involve local R.C.M.P. officers, members of the Armed Forces, pilots and any other local residents as resource personnel in a course of this nature. It would prove interesting to have a local trapper speak to the pupils on local conditions, methods of travel, the general topography and location of other settlements in the surrounding countryside.

FIRST AID

This section is in no way intended to represent a course in first aid. There are many publications listed at the end of the section which are highly recommended for use as resource materials for both teachers and students. Much of this material is obtainable at no cost. It would be wise for a teacher endeavouring to cover this section to make use of skilled personnel in the community such as the local doctor, nurse, R.C.M.P., Armed Services personnel or any other individual trained in first aid techniques.

The general objectives of first aid might be somewhat as follows:

1. To preserve life.
2. To minimize the effects of injury.
3. To prevent further injury.
4. To relieve pain and distress.
5. To encourage students and teachers to study the fundamentals of first aid.

These are some general principles which should be stressed basic to administering first aid:

1. It is extremely important for the first aider to know that he must carry out first aid measures only so far as they are necessary to sustain life, alleviate suffering and prevent deterioration of the casualty's condition until qualified medical care can be obtained.
2. The first aider should be quiet and as calm as possible. He should work quickly but must not rush around frantically.

3. Do not waste time looking for ready-made first aid materials.

Improvise with whatever is at hand.

Before carrying out first aid treatment, it is necessary to ascertain precisely what is wrong.

Listen carefully to the story of how the accident occurred; it may give valuable clues as to the probable nature of the injuries.

Ask the injured person to tell where he is hurt.

Examine the casualty quickly but systematically.

(a) look for bleeding to indicate wounds.

(b) feel the scalp for "bumps".

(c) see if he is able to raise his head and move his neck without pain.

If he can do this his neck is not broken.

(d) ask him to lift each arm and leg separately. If a limb cannot be moved, run a hand gently along it looking for areas of tenderness or swelling.

(e) ask him to take a deep breath and cough. If he can do so without pain he is unlikely to have broken ribs or serious chest injury.

(f) ask him to "pull in his stomach" and "blow it out again". If he can do this without distress, he is probably free from "internal" injury.

(g) without moving or lifting the casualty, run a firm hand down the centre of his back. A tender spot may mean a broken spine.

In examining an injured person, it may be necessary to remove some clothing. Do not remove or destroy clothing unnecessarily, but if further access to a part is essential, do not hesitate to cut the clothing sufficiently for the

purpose. When removing jacket, shirt, or trousers, always slip garment off the sound limb first, then off the injured limb.

WOUNDS

The first principle which should be impressed is that first aiders should not apply tourniquets or waste time trying to locate the allusive "pressure spots". Wounds that are likely to happen on the trail may be single or multiple, large or small, deep or shallow, ragged or clean cut, depending whether they are caused by knives, bullets, shot guns, ice, abrasions, can opener, dog bite or mauling by polar bears, or other means. The principle of first aid management of wounds is virtually always as follows:

1. CONTROL BLEEDING
2. PREVENT INFECTION

1. Control of Bleeding

It is important to appreciate that the bleeding from most wounds will stop spontaneously even though no treatment whatever is given. Nature has two highly effective methods of minimizing blood loss:

a. Retraction of Vessels

Because of "elastic" fibres in their walls, blood vessels, when cut across, promptly pull back into the tissues and shrink in diameter. At the same time the inner layer of the vessel wall curls back into itself and thus tend to block the tube. These blood vessel reactions are surprisingly effective so that it is not unusual to see patients with quite large wounds who have lost relatively little blood.

b. Clotting of Blood

As soon as blood escapes from the vessels in which it is normally contained it undergoes the phenomenon of "clotting" by which it

changes from a liquid to a jelly. Substances released from damaged tissue tend to accelerate this process, which ordinarily occurs in from three to seven minutes. Blood clot seals the open vessels and plugs the wound, thereby preventing further bleeding. By three simple measures the first aider can help Nature to stop bleeding:

1. Rest

If the casualty is encouraged to lie down quietly and particularly to keep the wounded part still, his blood pressure will drop, his pulse will become slow, and the amount of blood flowing into the wounded area will diminish. All of these factors will help to minimize the loss of blood from the wound.

2. Elevation

Blood, like water, does not readily run uphill. If it is possible to elevate the wounded arm, or leg, or head, above the level of the heart, bleeding will be diminished and will stop more quickly.

3. Pressure

THE APPLICATION OF FIRM PRESSURE DIRECTLY ON THE WOUND IS BY FAR THE MOST IMPORTANT METHOD OF CONTROLLING HEMORRHAGE.

Ordinarily pressure is applied through a dressing which is bandaged firmly on the wound. The dressing should be thick and compressible to facilitate the application of even pressure over the whole wound area.

It is easy to understand how the pressure of a firm dressing reduces bleeding:

It compresses all blood vessels leading into the wound and so

lessens blood flow.

It retains shed blood in the wound until clotting occurs.

If bleeding is not quickly controlled by a properly applied dressing, put on more pressure:

- a. by adding a further dressing on the outer side of the first and bandaging more tightly (i.e., "reinforcing the dressing")

OR

- b. by pressing on the dressing with the palm of the hand.

Rarely, in cases of profuse bleeding, when a dressing is not immediately available, is it permissible to press with the bare hand directly on the bleeding point. The exact site of maximum pressure can be altered until the effective position is found. If such pressure is maintained for ten minutes by the clock it will almost always be found possible to replace the hand with a snugly applied dressing.

IF SUFFICIENT PRESSURE IS APPLIED TO THE WOUND, BLEEDING WILL ALWAYS BE CONTROLLED.

Here we accept the risk of introducing germs into the wound; but if the rapid bleeding is not stopped, the casualty may die.

Very occasionally, in a wound of arm or leg involving a large artery, bleeding is so rapid and forceful that it can be controlled only by constant pressure with the hand over the cut vessel. For such cases the first aider must move with the casualty to the hospital so that the vital pressure may be

maintained without interruption.

The tourniquet is NOT recommended as a first aid measure. It is often ineffective and frequently harmful. Bleeding can always be stopped by the safe, simple methods described above.

The loss of large amounts of blood will lead to pallor, weakness, collapse, unconsciousness, and death. In such cases, after control of hemorrhage, it is necessary at the earliest opportunity to replace by transfusion the blood which has been lost.

PERSONS WHO ARE BELIEVED TO HAVE LOST LARGE AMOUNTS OF BLOOD MUST BE TAKEN AS QUICKLY AS POSSIBLE TO A HOSPITAL OR OTHER INSTITUTION WHERE BLOOD TRANSFUSIONS CAN BE GIVEN.

2. Prevention of Infection

Infection means the growth of harmful germs in a wound. Within a few hours or days the wound which is infected becomes red and angry looking ("inflamed"), swollen, hot, increasingly painful, and may discharge pus. Healing is delayed. The patient may feel sick with headache, feverishness, chills, aches and pains. Spread of the infection to deeper tissues or to blood stream ("Blood poisoning"), may lead to serious illness or even death.

Until recent years infection was the commonest complication of wounds and the most frequent cause of death from wounds. Improvements in first aid and surgical treatment, and the introduction of penicillin and other antibiotics have been responsible for greatly reducing the

incidence of serious wound infections.

TO PREVENT INFECTION IN WOUNDS WE MUST KEEP GERMS OUT. We can best accomplish this objective if we understand clearly how germs get into wounds.

There are just two ways by which germs can enter wounds.

1. Some germs may be embedded in the wound by the knife, bullet, rusty nail or other object which causes the injury. The problem with these "embedded" germs is how to remove them.
2. Some germs may be implanted in the wound after the original injury.

These come from two main sources:

- a. the noses and throats of persons who breathe, talk, cough or sneeze into the wound (i.e., droplet infection).
- b. the skin of careless first aiders, nurses, or doctors, who allow their fingers to enter or touch the wound.

The problem with these "implanted" germs is how to kill them in the wound.

We can now understand that there are two methods of preventing infection.

1. Removal of germs embedded in wound at time of injury: Complete removal of these embedded germs can be accomplished only by the surgeon who, aided by anaesthesia, opens the wound widely and washes it out thoroughly. This procedure should be carried out as soon as possible; every half-hour of delay makes the surgeon's job more difficult and less certain; this again is another reason for getting the casualty to the doctor quickly -
"FIRST AID must not delay FIRST TREATMENT".

However, when circumstances permit it to be done promptly, as in many peace-time accidents, the first aider may help by washing out the wound with a large quantity of sterile water. (Cool boiled water is preferable but, in municipalities with water purification systems, tap water is acceptable).

2. Protection of wound against germs being implanted after the injury:

This is the main objective of first aid in relation to wound infection. It is readily accomplished:

COVER THE WOUND AS QUICKLY AS POSSIBLE WITH A STERILE OR CLEAN DRESSING AND KEEP IT COVERED.

Before applying the dressing,

If possible, wash your hands carefully.

It is also advisable, under ideal circumstances, to wash off the skin around the wound with soap and warm water.

While applying the dressing,

do not breathe, talk, cough, or sneeze into or over the wound.

Either cover your mouth and nose with a "mask", (i.e. clean handkerchief), or keep your face turned slightly away from the wound until the dressing is in place.

Keep fingers out of the wound.

Do not touch the surface of the dressing which will be placed next to the wound.

FOREIGN BODIES IN WOUND

Large foreign bodies, such as fragments of glass or metal, if projecting from the wound may be gently removed, providing this can be done without putting fingers into the wound.

ANTISEPTICS

It should be emphasized that "antiseptics" are almost completely ineffective in killing or removing germs embedded in a wound. The chief result of introducing these strong chemicals into a wound is to cause unnecessary pain and to damage the exposed tissues.

For this reason iodine and other antiseptics have no place in first aid and should not, under any circumstances, be poured into or on a wound.

COMPLICATED WOUNDS

1. If the casualty is coughing blood, as from a lung wound, set him up with his head supported.
2. If the casualty is vomiting blood, as from a damaged stomach, bend his knees and make him as comfortable as possible.
3. For chest wounds, make the wound airtight.
4. For abdominal wounds, give nothing by mouth.

FRACTURES

A fracture is a broken bone.

DIAGNOSIS OF FRACTURE

It is important to be able to recognize a fracture. In many cases there is no difficulty.

The following are indications of fracture:

The injured person says that he heard or felt the bone snap.

OR

The limb is bent in a way that could only occur if the bone were broken (i.e. "Deformity").

In other cases the diagnosis of "fracture" must be made on more indirect evidence:

Unusually severe pain which is made worse if either casualty or first aider tries to move the injured part.

Marked tenderness on pressing gently with the fingers over the exact site of fracture along a bone. Even a few inches away from this point the tenderness caused by light pressure will be much diminished.

Unnatural mobility, i.e., the limb seems to bend at some place other than a normal joint.

Swelling usually occurs rapidly but is not reliable as an early sign of fracture.

In many cases the diagnosis of fracture can be made with certainty only by means of an X-ray examination. Hence -

WHEN IN DOUBT TREAT AS A FRACTURE.

General Principles of First Aid for Fractures

Every unnecessary movement of the sharp ends of a broken bone causes extra pain and increases damage to surrounding tissues - muscles may be lacerated, blood vessels may be cut, nerves may be injured. The sole objective of first aid for fractures is to avoid these complications by IMMOBILIZATION, which means "to fix the injured part in such a way as to minimize movement at the site of fracture".

Immobilization is accomplished by applying a splint, i.e., "a rigid support for the broken bone". There are many types of splint, for example -

an uninjured portion of the casualty's body, e.g. the opposite leg, or trunk.

a prepared metal or wooden splint.

an improvised splint - wooden slats, rifle or shot gun (unloaded), axe handle, gaff, fish spear, harpoon.

a stretcher on which the casualty lies, e.g., in the case of a broken back or neck.

the casualty's own muscles - most important in the mouth, the muscles surrounding and attached to a broken bone may be amazingly effective in producing immobilization. Therefore, as will be explained later, external splinting is unnecessary in certain types of fracture.

Rules for Splinting Fractures

- i) If a splint is necessary, apply it before moving the injured person, i.e., "splint them where they lie". Of course, it is not always possible to adhere strictly to his rule - it may be necessary to move the casualty out of danger before first aid can be carried out.
- ii) If possible while applying a splint have the injured limb supported very steadily by an assistant. The simplest and most effective way of steadying a broken arm or leg is to pull firmly on hand or foot, i.e., "TRACTION" - this stretches the muscles tightly around the broken bone thus straightening it and steadying it at the same time. Only while traction is being applied is it possible to apply splints and bandages without causing extra pain or producing further damage.
- iii) Fasten the limb to the splint securely by bandages above and below the fracture and at either end of the splint.

Bandages should be carefully "snugged up" to hold the injured limb firmly without being so tight as to be uncomfortable or to run the risk of shutting off the circulation of blood.
- iv) Use padding as necessary to fill in the hollow between the straight splint and the normal curves of the injured limb and also to avoid uncomfortable pressure against protruding bony points as on outer side of ankle, hip or elbow.

Management of Open ("compound") Fractures

The wound and the broken bone must each be dealt with in the usual way:

- 1) Steady the fracture (usually by traction)

ii) Dress the wound

iii) Splint the fracture

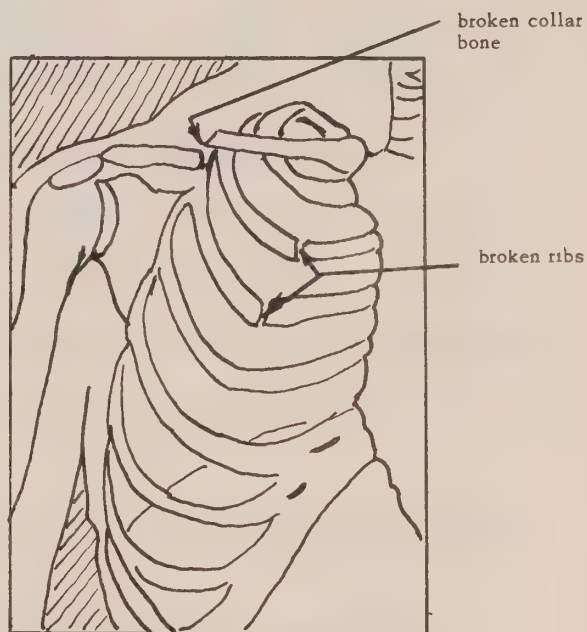
In the occasional case where the broken bone is protruding from the wound, do not make any attempt to pull or push it back under the skin. Just cover it with a dressing and try to keep the injured limb as steady as possible until the casualty reaches hospital.

Examples of First Aid Treatment for Fractures

The general principles outlined above may be readily adapted to the management of fractures of the various bones:

1. "COLLAR BONE" (CLAVICLE)

"Broken collar bone" is one of the commonest of all fractures. It is usually caused by a fall on the outstretched hand. The injured person holds his arm rigidly against the side of his chest and complains of pain on any movement. If the first aider runs his fingers gently along the collar bone he will come to one spot which is very tender.



The muscles attached to this bone will keep it adequately splinted provided the arm is not moved. First aid is, therefore, simple.

i) Place a small pad in the armpit and bind upper arm to the side of the chest.

ii) Put the forearm in a St. John sling.

2. HAND OR FOOT

Fractures of the small bones in hand or foot, fingers or toes, do NOT require any first aid splinting. An injured hand should be cradled in a sling. A person with a fracture of the foot will be unable to walk and so will require some form of hand carriage or transportation.

3. WRIST AND FOREARM (RADIUS AND ULNA)

"Broken wrist" like "broken collar bone" is a very common injury.

It, too, is usually the result of a fall on the outstretched hand.

Fractures of the shaft of the forearm bones are more commonly produced by a direct blow somewhere between elbow and wrist.

Casualties who have broken wrist or forearm are usually found carefully supporting the injured limb with their other hand. Visible deformity, marked tenderness over the site of fracture, and unwillingness to use the arm and hand, make the diagnosis easy.

First aid is as follows:

i) Steady the injured forearm by traction, i.e. firm pull between fingers and elbow.

ii) Apply splint from knuckles to elbow.

4. UPPER ARM (HUMERUS)

Diagnosis is usually not difficult. The injured person holds the arm against his side and complains of severe pain on the slightest movement or touch.

Nature has provided for this fracture a splint which is always available - the side of the chest. Hence, to give first aid,

- i) Place a soft pad between upper arm and chest wall.
- ii) Fasten the arm against the side of the chest by bandage or adhesive tape or by pinning the sleeve to the vest or jacket.
- iii) Put the forearm in a sling.

5. THIGH BONE (FEMUR)

This is the largest bone in the body - a fractured femur is always a serious injury.

Fracture of the upper end of the femur is usually called "a broken hip" - It is commonly caused by a simple fall in old people whose bones have become fragile and brittle.

The casualty says, "I have a bad pain in my hip"; the limb cannot be moved; the leg tends to roll outwards so the foot points outward while the opposite foot points forward. In many cases the injured limb appears shortened.

Fracture of the shaft of the femur can be produced only by powerful force as may occur in falls from a height, explosions, or by penetrations - such things as bullets.

Persons with this injury have great pain, and are quite unable to use the affected leg. There is marked tenderness usually sharply localized over the site of fracture. In some cases deformity is not apparent. The thigh quickly becomes swollen. First aid for thigh fractures must be prompt and precise:

- i) Steady the fracture by traction, i.e. have an assistant pull steadily but firmly on the foot, keeping the toes pointed upwards.
- ii) Immobilize by either of following methods:
 - (a) bind injured limb to sound limb by bandages about upper thigh, above and below knee, around ankle and foot;
 - (b) apply a long rigid splint such as a wooden slat to the outer side of the limb from sole of foot to lower part of chest. Fasten splint securely with bandages around lower chest, hips, upper thigh, above and below the knee, ankle and foot.
- iii) Carefully lift the casualty on to a stretcher and evacuate to hospital.

6. SHIN-BONE (TIBIA)

Since this is a large bone covered with relatively little muscle, diagnosis of fracture is seldom in doubt. Deformity is frequently apparent, and localized tenderness to gentle pressure over the "break" can readily be detected. First aid as follows:

- i) Have an assistant steady the leg by traction on the foot.
- ii) Splint - two useful methods are suggested:
 - (a) a sleeping bag or blanket wrapped firmly around leg, ankle and foot, and fastened with safety pins or bandaged securely. This makes an effective and comfortable splint
 - (b) wooden splints, preferably on both sides of the leg, from sole of foot to upper thigh, fastened by bandages above and below knee, and at either end of splint.
- iii) Transport for treatment.

7. ANKLE

A violent "twisting of the ankle" frequently results in fracture of one or more of the bones close to the joint. There is severe pain and usually marked swelling of the ankle; most persons with this injury cannot walk, but a few will limp about in great distress. The injury is usually described as a "badly sprained ankle" until an X-ray examination establishes the correct diagnosis.

As far as first aid is concerned this type of fracture may be treated merely by transporting the casualty on a stretcher to the nearest medical aid. If the trip is likely to be long or bumpy, increased comfort may be obtained by wrapping folded blankets around the foot and ankle and fastening it securely with safety pins or bandages.

8. RIBS

These are usually broken by a crushing injury of the chest in which the ribs crack like barrel staves which have been bent too far; less frequently rib fractures may be caused by a direct blow on the chest wall as, for example, in a fall against the corner of a table.

The person who has broken ribs will complain of pain on breathing deeply and especially on coughing. Occasionally, if the underlying lung has been damaged, a small amount of blood may be coughed up. There is no effective means of first aid splinting for this injury. The casualty should be put at rest upon a stretcher and taken to a hospital or doctor's office. If his breathing seems difficult, some relief may be obtained by propping him up in a semi-sitting position.

9. SPINE ("BROKEN BACK" OR "BROKEN NECK")

Fracture of the neck most commonly occurs as a result of diving accidents in which the head strikes an unsuspected shallow bottom. Another mechanism by which this injury may be produced is the sharp snapping of the passenger's head forward or back when a speeding automobile, plane, or train, crashes to a sudden stop.

Broken back is usually caused by falls from a height with the victim landing on his back, feet, or buttocks. The injury may also be produced by a heavy weight (e.g. falling tree, or masonry) striking the casualty so that he is bent forward in a sudden violent manner.

The person with a fractured spine usually has such pain in his back and neck that he is literally "afraid to move". Remember that ANY CARELESS MOVEMENT OF THE BROKEN BONES MAY CRUSH THE SPINAL CORD AND PRODUCE PERMANENT PARALYSIS AND LOSS OF SENSATION.

This is one injury in which the first aider must not hurry but proceed slowly and with care and caution.

- i) get two or three assistants and instruct them carefully.
- ii) the casualty must be moved on to a firm, flat stretcher, (an improvised stretcher, such as a door, wide board, shutter, sled etc., will do quite well) keeping his neck and back stiff and straight, and taking great care to avoid bending or twisting him.

If damage to the spinal cord has already occurred, the casualty will be unable to move his feet and legs (i.e., "paralysis") or to appreciate when his skin is touched in that area, (i.e., "loss of sensation").

BURNS

A "Burn" is the damage to body tissues caused by exposure to extreme heat.

Burns vary in their "depth" and in the "area" of body surface involved.

THE "DEPTH" OF A BURN IS IMPORTANT:

(a) "Superficial" burns - Only the outer layers of the skin are damaged.

The burned area looks fiery red and may become blistered. There is very severe pain. Healing is rapid and leaves little scar.

(b) "Deep" burns - Full thickness of skin is destroyed and underlying fat and muscle burned to varying depths. The burned area usually has a yellowish-white "cooked" appearance. There is less pain because nerves in skin have been destroyed.

Healing is slow and often results in disfiguring scars.

THE "AREA" OF A BURN IS EVEN MORE IMPORTANT:

The immediate outcome of a burn is determined by its area.

The larger the area burned the more seriously ill the casualty will become. Any burn, even though superficial, involving one third or more of the body surface may result in dangerous illness. If one half or more of the skin is involved, death will frequently ensue.

TYPES OF BURN

The characteristics of any particular burn are determined by its cause:

Contact with red hot metal will cause a sharply localized burn which may be quite deep.

- A fire burn - clothes on fire, flaming gasoline, or caught in a burning building - usually involves a large area of the body and in some places is quite deep. Charred clothing is often stuck to the burned surface.

- A scald is a burn caused by steam, boiling water, or other hot liquid; it is generally quite superficial but may be extremely serious if a large part of body is involved.
- Chemical burns are caused by strong acids or caustics that can quickly damage skin on which they are spilled or splashed. Burning will continue until the offending chemical is either washed away by water or neutralized by the appropriate antidote.

FIRST AID FOR BURNS

Unfortunately first aid measures for dealing with burns are rather limited. There is no effective way of relieving the agonizing pain of extensive burns except by morphine or other hypodermic sedative.

When the burn is confined to part of one limb, such as one hand or one foot, some lessening of the pain may be achieved by immersing the injured area in cold water. Unless medical attention seems imperative it is safe to continue cold treatment until the phase of severe pain is past, usually one to two hours.

SERIOUS BURNS (i.e., any burn covering an area greater than that of an eight inch square, and all deep burns)

- i) Remove or cut away clothing over burned area but do NOT attempt to pull off clothing which is stuck.
- ii) Cover burned area with sterile or clean dressing and bandage or fasten securely.

In case of burns covering a large part of the body, it is sufficient to cover the area with a clean sheet or towel.

- iii) If the casualty is thirsty, he may be allowed to drink small amounts of

clear fluids such as water or tea.

iv) Place on stretcher and evacuate quickly to hospital.

DO NOT PUT VASELINE, BURN OINTMENT OR ANY GREASY SUBSTANCE ON SERIOUS BURNS. These remedies have only slight value in reducing pain while they greatly complicate the surgical treatment of the burned area.

CHEMICAL BURNS

i) Wash off immediately with large volume of water.

ii) Apply neutralizing agent if available.

- for acids - solution of baking soda

- for caustics - dilute vinegar

iii) Put on dressing.

NOTES ON RESCUE OF BURN CASUALTIES

When a person's clothing catches fire approach him holding a rug, blanket, or coat in front of yourself for protection, wrap it around him, lay him flat and smother the flames.

In attempting to rescue persons from burning buildings, vehicles or aircraft, observe the following precautions.

i) cover your nose and mouth with a wet cloth to keep out the superheated air which might burn your lungs.

ii) always feel a door before opening it - if it is hot, open very cautiously to avoid being caught in a blast of flame and hot air.

iii) be conscious of danger of explosion.

FROSTBITE

Frostbite is the freezing of some part of the body. It is always likely to occur in sub zero weather especially when there is a wind.

Signs and symptoms:

- (a) Frostbite can be seen before it is felt. Therefore people should help each other by watching for the tell-tale spot on the other person and helping him thaw out.
- (b) The skin assumes a dull whitish pallor.
- (c) There is a feeling of numbness or prickling associated with the forming of ice crystals in the tissues but no pain.
- (d) With freezing the tissues are solid and immovable.
- (e) Prolonged exposure to cold causes the person to become numb and drowsy, his eyesight fails, he becomes unconscious and his respiration may cease.

REMEMBER: Unless he is already a casualty and unable to help himself, only a negligent person gets serious frostbite.

IT IS EASIER TO PREVENT FROSTBITE OR STOP IT IN ITS VERY EARLY STAGES THAN TO THAW AND TAKE CARE OF BADLY FROZEN FLESH.

To prevent severe frostbite -

- (a) 1. Dress to protect yourself against cold and aircraft propeller blast, protect your face.
- 2. Keep dry, and that applies to sweating as much as to any other wetness.
- 3. In extreme low temperatures be careful not to touch metal with your bare skin.
- (b) Exercise exposed parts of your body frequently. Wiggle your face, fingers, and toes from time to time to keep them warm and to detect any numb or hard areas. Move your ears with your hand from time to time for the same purpose.

- (c) Also use the buddy system. Watch your buddy's face to see if any frozen spots show and have him watch yours. Thaw any frozen spots immediately using your bare hand or other source of body heat.

In case of frostbite, follow these first aid procedures:

1. Get the casualty in heated shelter if possible.
2. The frozen part should not be warmed rapidly. Local or direct heat should not be used. To avoid interference with the circulation by constriction, care must be exercised in the wrapping of the frozen extremity in blankets or clothing for transportation. Within a heated shelter leave limb exposed at room temperature, preferably not higher than 78⁰ F. Prevent the pressure of blankets on the frost-bitten extremities. Do not open blisters. Protect with sterile dressing if indicated. Do not use vaseline gauze. Give warm drinks, food and clothing. In cases of prolonged exposure to severe cold, rapid warming of the body is indicated. Use artificial respiration if necessary.
3. Every attempt should be made to employ body heat to aid in thawing. Hold a bare warm palm against frostbitten ears or parts of the face. Grasp a frostbitten wrist with a warm bare hand. Hold frostbitten hands against the chest, under the armpits, or between the legs at the groin. Hold a frostbitten foot against a companion's stomach or between his thighs.
4. When frostbite is accompanied by breaks in the skin, apply a sterile dressing. Do not use strong antiseptics such as tincture of iodine. Do not use powdered sulfa drugs in the wound.

5. Never rub frostbite. This may tear frozen tissues and cause further tissue damage. Never apply snow or ice; cold injury is increased by so doing. For the same reason, never soak frozen limbs in kerosene or oil.
6. Do not try to thaw by exercising. Exercise of frozen parts will increase tissue damage and is likely to break the skin.
7. Use litter or sled evacuation in cases of frozen lower extremities to prevent further injury. Get the casualty into a casualty evacuation bag if available and evacuate to a heated shelter rapidly.

RABIES

If during your wanderings in the bush, you notice a wild animal that appears to be sick, or behaves abnormally, showing ferociousness where it would usually show fear, such an animal may have rabies. Foxes normally avoid people; skunks do not usually approach people and try to bite them; on the other hand, squirrels and chipmunks are frequently coaxed to feed from a person's hand and if a bite is inflicted it does not necessarily mean abnormal behaviour or an unprovoked attack.

Prevention and Treatment

Do not pet any wild animal, no matter how tame it may appear to be - lack of fear of humans is a bad sign.

If a person is bitten or scratched by, or comes in contact with the saliva of a suspected rabid animal, the affected parts should be thoroughly washed with soap and water for fifteen minutes.

If iodine or other antiseptic is available, put it in or around the wound.

Get in touch with a doctor as soon as possible.

TRAVEL

Under most circumstances travel should only be as far as necessary to find a good, safe, dry location for your camp. If you decide to travel, you must travel while you have strength.

There are five basic requirements for travel. If any of these cannot be fulfilled to your specific situations, then don't travel.

- (a) Know where you are and where you are going. If you do not know where you are, you can rarely plan a route to safety. Stay put!
- (b) Have a means of setting and maintaining direction. If you have a hand compass and know how to use it, you should be able to maintain a planned course. If you are unable to maintain such a course - sit tight.
- (c) Most people are inclined to over-estimate their physical abilities. Be very careful when trying to estimate your physical stamina, and if in doubt, don't start out.
- (d) Clothes make the man. This is particularly true in survival when the proper clothing can mean the difference between life and death. Make certain you are adequately clothed to give protection from the elements and insects. Adequate shoes and heavy socks are most essential. Unless your clothing is sufficient to protect you against conditions which you may encounter - sit and wait.
- (e) Food, fuel, shelter and signals must be considered in relation to the type of country and the season. If these are available in the area in which you are and you are unable to carry these with you, it is much better to remain where you are.

BUSH TRAVEL

SUMMER

Bush travel in summer is relatively easy, if the following rules are followed:

Before beginning any trip, climb a high hill or large tree to orient yourself with the surrounding area and possibly discover human habitation.

Game trails provide an easy path through bush country. These trails follow the ridges and river flats and are connected by a network of trails. The danger in following these trails extensively may cause you to wander from your intended direction.

Streams may be followed to larger rivers or lakes, along the shores of which you are most likely to find habitation. Generally, it is better to follow the drainage pattern rather than cross it. Unless the waterways in the area are well known to the survivors, raft building is not recommended.

Ridges offer drier, more insect-free travel than bottom land. There will usually be less underbrush and as a result it will be easier to see and be seen.

Large river crossing should be attempted only when absolutely necessary.

If the water is deep, remove all clothing and place it in a bundle. Replace your boots without socks. Boots give a much better footing and prevent injury to your feet during the crossing. If forced to swim in fast flowing rivers, start up-stream from your proposed landing place and let the current drift you down to it. When fording a fast shallow stream use a pole to help you maintain a footing.

Decide whether to cross or go around each lake. If it is decided to cross, use a raft or flotation gear. Swimming in cold waters can be treacherous.

Deadfalls can prove dangerous because of the ever present danger of slipping, resulting in injury. Swamps sap the strength of a person because of difficult walking conditions. Go around such areas.

Mountain areas have their own particular problems. Watch for overhead threats such as shale and rolling boulders. In early spring, cross mountain streams in early morning to avoid the greatest volume of water which occurs when the sun starts melting the snows.

WINTER

Game trails, especially if heavily used, will save walking through deep snow, but you must avoid being led off your general direction.

Streams and rivers will provide your best method of travel, being the high-ways of the Canadian north. There are, however, dangers in winter river travel which must be carefully watched for and avoided. In certain places along the river, weak ice will be found, and it is best to know in advance where to look for it.

- (a) Stay away from rocks and other protrusions, since ice is slower to form in these localities and will have been retarded by eddies.
- (b) Walk on the inside of curves, since on the outside of curves the river current has an eroding effect on the under side of the ice surface.
- (c) Take to the bank or walk on the opposite side of the river at the junction of two rivers. The current from both rivers holds up the formation of ice through turbulence.

- (d) Stay on clear ice when possible since a deep layer of snow will insulate and retard freezing.
- (e) Carry a pole for testing ice and for use in supporting your weight if you break through the ice.
- (f) Be prepared to get rid of your pack if you should fall through the ice.

Ridges may give easier walking conditions as they do not usually have the same amount of snow as the valleys.

Mountain areas, in winter, can be particularly treacherous, with the possibility of snow slides, uncertain footing and sudden storms. Snow slides will occur from natural causes, but care should be taken to avoid causing them through carelessness.

Deadfall is even more dangerous in winter than in summer since a lot of it will be covered with snow, making walking conditions very treacherous.

BARREN LAND TRAVEL

Snow shoes and skis are not essential on hard snow. On the Arctic Islands and barrens east of the 142nd meridian, walking conditions are normally good in winter. In some localities frequent gales are encountered. There is little protection except that provided by scattered high banks and willow thickets around lakes and along stream beds. Game is very scarce and fires cannot be maintained for long on the fuel obtainable in the winter. The survivors cannot afford to follow the streams which, because of their winding nature, double and quadruple the distance to be covered. The compass is

not reliable and landmarks are few and far between. One man will have difficulty steering a straight course by himself. Two can do a little better but three are required to navigate when visibility is low. It is recommended that any extended travel over barren or sea ice be done by a party of at least three.

The spring break-up, summer and the fall freeze present far greater travel difficulties than does the winter season. Equipment must be carried on the back. The masses of soggy vegetation on the tundra cause the traveller to slip and slide. Lakes systems must be either crossed or circumnavigated. Care must be taken in crossing sandbars and mud flats formed at the mouths and junctions of rivers and lakes. Quicksands or bottomless muck may trap you. If a life raft is available, it is preferable to float down the river rather than attempt to travel across country. The months of July and August are about the best months for cross country travel. Because of the prevalence of fish in all streams or lakes, a fish net is one of the best pieces of equipment the traveller can carry. A rifle may provide game for a number of meals.

SEA ICE TRAVEL

Food in the form of seal, fox and polar bear is more readily obtained on winter sea ice than on barren land. Unless serious injury prevents travel, do not split up the party. The problems of navigation are identical with those on the barren lands with one very great exception. The polar ice pack is in constant motion due to the currents and winds. Therefore, determination

of direction may be difficult. Also one rarely travels in a straight line, in order to avoid the rough ice. Landmarks in the form of high pressure ridges and hummocks are usable only for short distances, since they may be located on other floes and constantly changing location. Add to this fact that the magnetic compass is very unreliable in high latitudes and the necessity for constant directional checks on the sun and stars become obvious.

The ice in the very high latitudes is comparatively solid in winter. As the sun returns the ice recedes and there is open water along the entire arctic coast. Along the north coast, ice lies off shore and is often driven ashore by strong north or west winds. Riding one of these floes is definitely a last and dangerous procedure, since there is no guarantee that the wind will continue until the floe reaches ground.

The summer ice is covered with lakes and water soaked snow, which gradually drains off through holes and cracks in the ice mass. There is practically no dry surface anywhere. Fogs abound and misting rain falls frequently. Survivors should leave the ice and get to land if at all possible.

All icebergs frozen in the ice are likely to have open water in their vicinity. Icebergs driven by the wind and currents have been known to crash through ice several feet in thickness. Towering icebergs in open water are always dangerous as the area below the surface melts faster than that above causing it to topple over and the adjoining area is no place for man or beast. The resulting tidal waves throw the surrounding small ice pieces in all

directions. Seek only low topped icebergs for shelter at sea.

Messages

Messages should be left at every stop. A message should also be left at any point at which a change of plans is put into effect. The message should contain the following information:

- (a) date of leaving original point
- (b) destination and route
- (c) estimated length of the journey
- (d) number in the party
- (e) physical condition of the party and -
- (f) any other pertinent data

Make certain the message is left in a readily accessible place. Lacking a pencil or pen, messages may be written with charcoal.

SHELTER

Everyone who travels on land in the Arctic or the barren lands in winter should be able to build a snow house. This skill could easily mean the difference between life or death if an accident or sudden blizzard conditions make unexpected delays necessary.

It is a skill that can be taught to quite small children and it is often possible to find a local resident who is very happy to teach the local technique.

The following notes are adopted from "Down But Not Out", published by the Queen's Printer. The teacher might find many learning situations and an excellent opportunity to learn from and involve pupils and local people in a project of this type.

Shelters in Bush Areas

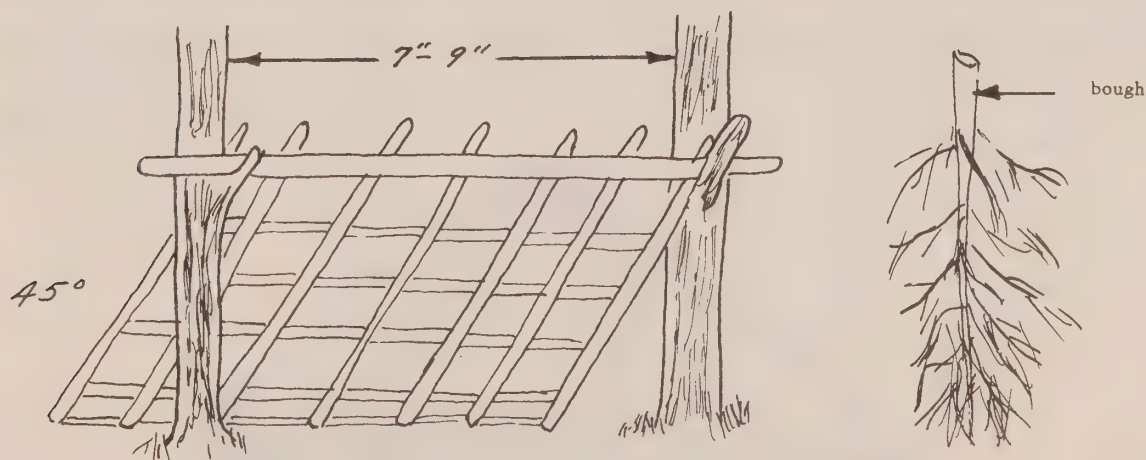
When it is necessary to spend a night on the trail or in an emergency (especially involving injuries to members of the party) it may be an advantage to build a shelter. The most common and practical is the "Lean-To".

The Lean-To

A pole framework is covered with a thatching of evergreen boughs or rushes. When constructing the lean-to, find two trees seven to nine feet apart with fairly level, firm ground between them. The distance between the trees will be the length of the opening of the lean-to although it is possible to incorporate variations. The number of people requiring shelter should determine the size. When constructed for one man it should be made long enough for him to sleep across the open mouth of the shelter, whereas for more than one it should be planned for them to sleep lengthwise. One or both ends of the

ridge pole may be supported by a pole tripod instead of utilizing standing trees. This leaves the builder a wider choice of sites. It should be remembered that the steeper the slope angle of the roof the better it will shed rain and reflect heat from the fire. A 45 degree slope angle is generally considered a suitable compromise between available interior space and rain shedding effectiveness.

Once the framework has been constructed, proceed with the covering. Spruce boughs make an excellent natural covering, although the branches of any coniferous and of many deciduous trees will do. They are placed on the lean-to in the same manner as shingles on a roof, the first row at the bottom. The brush ends of the boughs are placed down, overlapping the butt ends of the previous row. This method of thatching ensures that rain will be shed more readily. Continue to lay rows of boughs in this fashion until the top of the lean-to is covered. Then repeat the thatching procedure until the entire roof is covered to a depth of at least six inches. The triangular sides are filled in with large boughs set butt end up as in thatching.

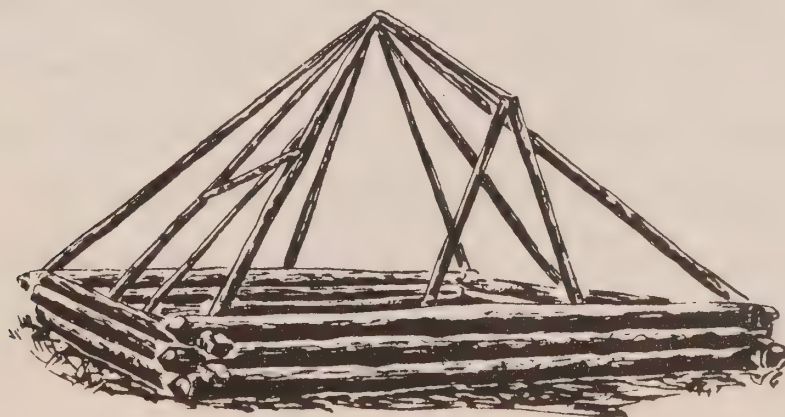


The Teepee

This is a simple erected teepee. Cut three poles approximately twelve feet in length. Tie these with rope or strips of skins or bark about eight inches from one end and set up as a tripod. Place extra poles about the tripod and lace together at the top. These may be covered with canvas or spruce boughs. Arrange the boughs in rows starting at the bottom and ending at the top. The front openings of all shelters should be kept crosswind. A fire is built in front of the opening.

Tarp-Cabin

This shelter requires a considerable amount of work and when completed will have a degree of permanency that other previously mentioned shelters do not have. In building the cabin, particular attention should be paid to the choice of location, as the cabin is not portable. Choose an area close to a water supply, yet not in a valley. The ridges offer much more comfortable living conditions, freedom from insects, flooding etc. The area chosen should also offer an abundant supply of long straight logs, four to eight inches in diameter. Build four walls log cabin fashion to a height of about three feet and then build a framework of light poles to support a covering of parachute material or canvas.



Para-cabin Framework

From this stage it is a simple matter to place this material over the framework to form a finished shelter. It is preferable to employ a double layer of fabric with an air space between to improve the insulating and water shedding qualities of the roof.

Shelters in the Arctic

Tools. The combination snow saw-knife or a snow knife is almost essential to survival north of the tree line. With it snow blocks can be cut to build a shelter while on the trail or if lost.

Material. The snow from which the snow house is built should be in a firmly packed and frozen form with several characteristics not often encountered south of the tree line. The snow should be solid enough that a cubic foot block will support the weight of a man, yet it can be cut, sawed, or split with ease. Only a small percentage of snow is suitable for snow house building. First search for an area where snow-drifts are deep enough to permit cutting snow blocks from a vertical face. This will require a depth of nearly two feet. The snow should be firm enough to support your weight with only slight marking by foot prints. Probe into the snow with your saw-knife or a long sturdy stick. Try to find a place where the resistance to the probe indicates an even firm structure, free of harder or softer layers. When you find a spot, probe around to ascertain whether enough good snow is available. It is well worth hunting for an hour to find proper snow as you will save the time during snow house building. If snow of sufficient depth to cut vertical blocks cannot be found, it will be necessary to cut them from

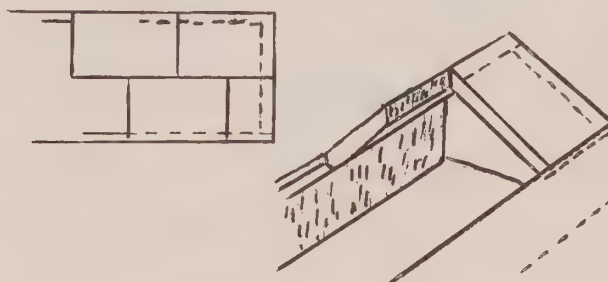
the flat surface of snow. This is time consuming and requires a much larger area of snow, and the snow house will have to be built higher, because it cannot be dug into the drift.

THE FIGHTER TRENCH

If time does not permit building an igloo, a fighter trench can be built easily and quickly with minimum work for the result achieved. This is simply a trench dug in the snow and covered by blocks to form a shelter.

If a large drift of snow at least three feet deep is available, the shelter can be made by cutting large vertical blocks from a trench just wider than the sleeping bag and long enough to accommodate the one or two builders. The snow blocks are stood on each side of the trench.

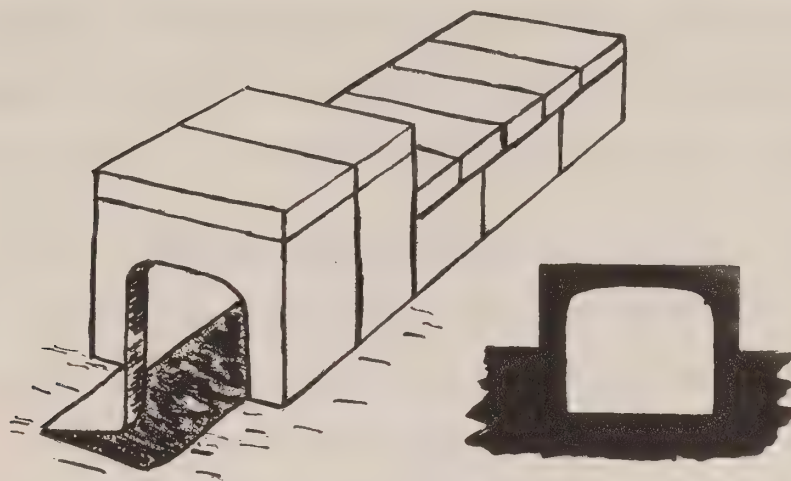
The first roofing snow block is cut shorter than the others, in order that the succeeding blocks will overlap, each supporting the next.



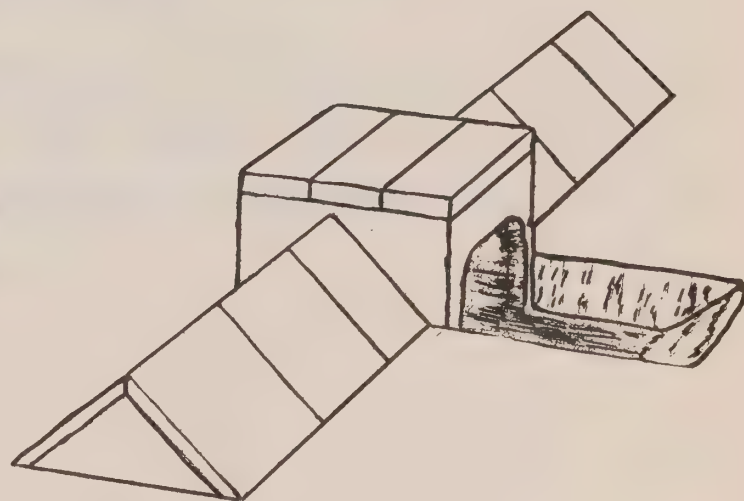
Commencing the Roof

When the trench is completed a notch is cut along each side to provide non-slip support for the snow block roof. A triangular block is placed at one end of the trench as a support for the first snow block of the roof. The first roofing snow block is cut shorter than the others, in order that the succeeding blocks will overlap, each supporting the next.

The remainder of the roof blocks are placed in a similar manner.



In a two man trench an entrance door is placed halfway down the trench, opening into a roofed over square pit which allows room for cooking and removing clothing before entering the sleeping bag. Be sure to cut a ventilating hole in the roof and have a good snow block handy to close the entrance at night.



If no deep snow drifts can be found, a trench style shelter can be erected by building a wall of blocks enclosing the shelter area. This wall is then roofed over with large slabs which are hollowed slightly on the inside, after erection, to form an arch.

The fighter trench while a good emergency shelter is too cramped to permit much movement without dislodging the frost on your clothing and sleeping bag, and in time you will become damp without a good means of drying out. This is why you should begin your igloo as soon as you can.

THE IGLOO

The word "igloo" is of Eskimo origin, and in that language it is a general word for "house" or "shelter". It will be used to mean the domed snow house, similar to that used by some Eskimo groups particularly in the central Arctic.

The Eskimo igloo is the ideal winter shelter in the Arctic. It is solid, sound-proof, and wind resistant, and it is large enough for comfort. There are a few building techniques which must be mastered but none of these are particularly difficult. Once the method is learned, the igloo will almost invariably be the shelter used in an emergency.

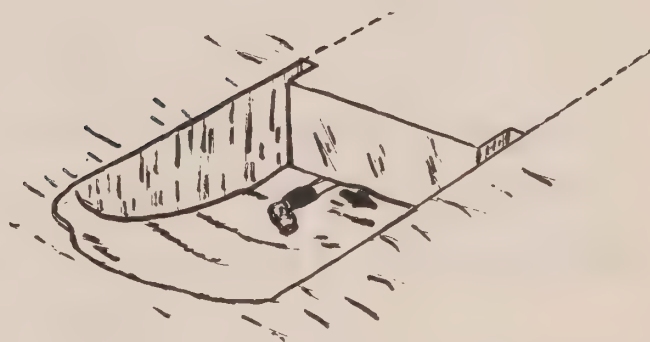
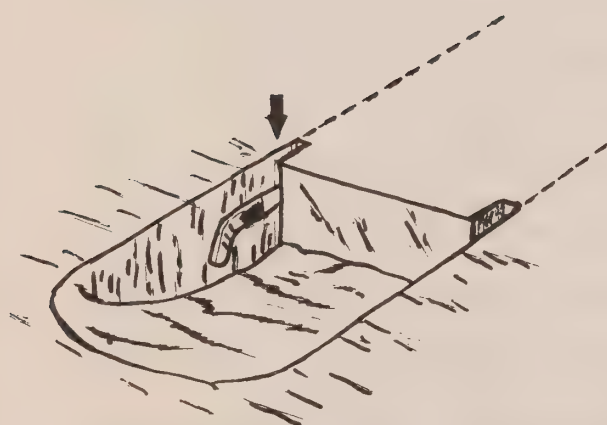
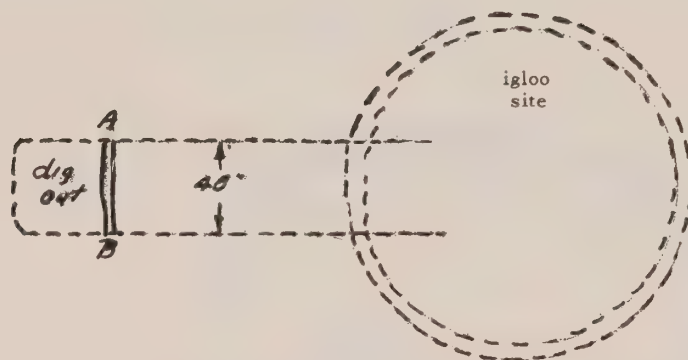
When you have found a good snow-drift, lay out the floor plan. The Eskimo does this by eye, but he has had a lot of practice. Draw a circle centered on snow, firm enough to support a person and at least twenty inches deep with the approximate diameter as follows:

One man	-	8 feet
Two man	-	9 feet
Three man	-	10 feet
Four man	-	12 feet
Five man	-	13 feet

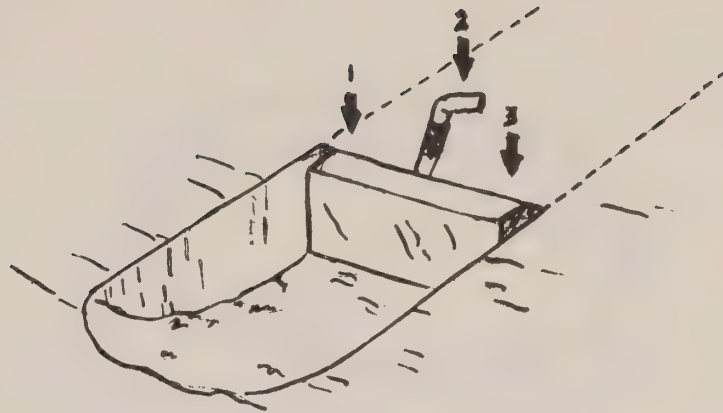
Now, begin to lay in a supply of snow blocks. Cut them from the face of a trench, laid out as shown, and to the depth of at least twenty inches.

Begin cutting blocks by digging out a clear vertical face at A-B, with a width of about 46 inches and a depth of about 20 inches. Smaller blocks are not much easier to cut, and igloo construction is slower and more difficult with them.

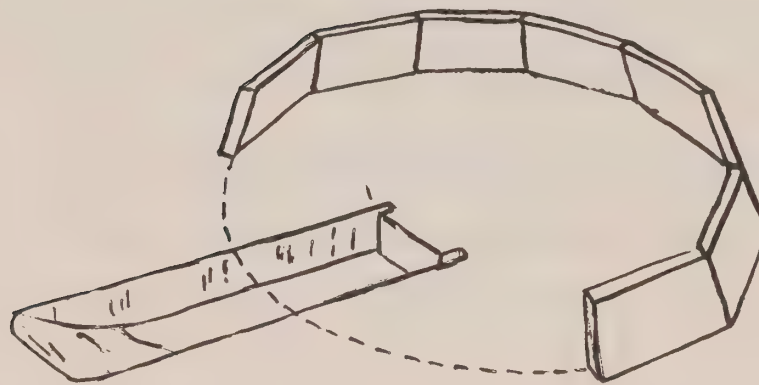
With your snow saw-knife, cut a slot at each end of the block, about two inches wide and the full depth of the block.



Next, score a groove parallel to the face, marking off a block about six inches thick.



Cutting out the block

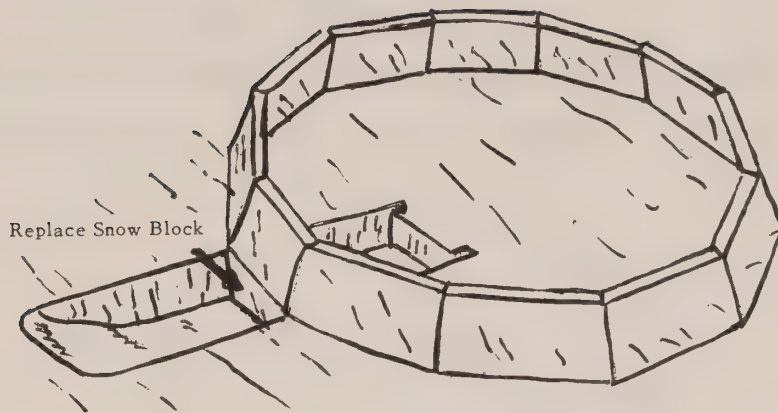


Commencing to build

If you have a snow saw-knife, saw along this mark, breaking off the block with a firm jab in the centre. If you are using a snow knife, deepen the groove by running the point back and forth, then three or four gentle stabs and a firm central stroke will break it off.

Lift the snow block to one side and begin another. When you have about a dozen cut, then you may begin to build.

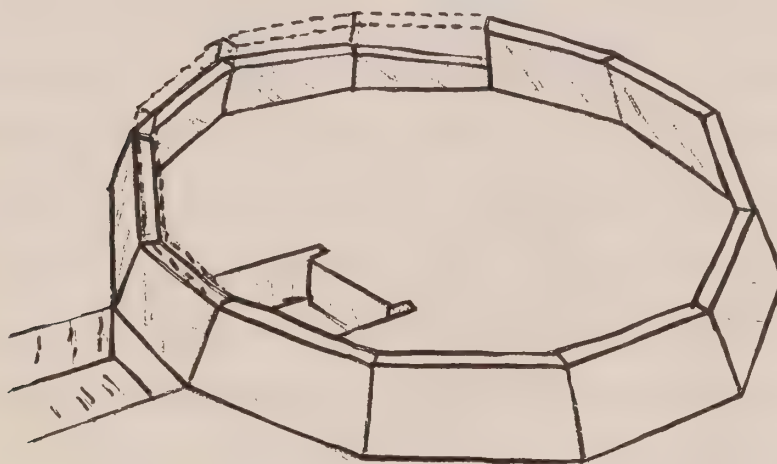
When the first row reaches the snow block trench, a snow block is replaced in it to permit the wall to be taken across it.



The first row completed

Note the slope of the first row of blocks. All end joints are fitted with faces radial to the igloo centre, or you are heading for trouble.

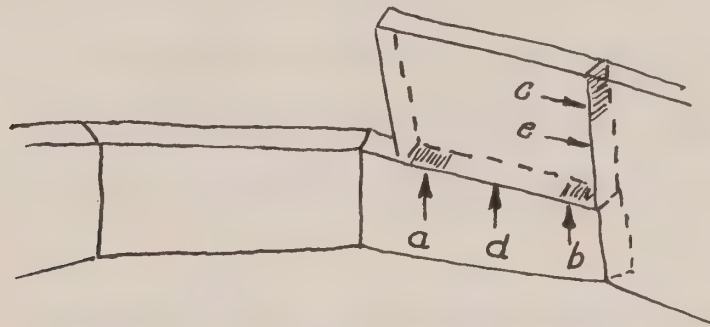
When the first row is finished, begin the spiral which will end at the key block. If you are right handed, cut away any three blocks diagonally, sloping down from left to right. If you are left handed cut the slope the other way.



Carving the spiral

Now fit the next block, leaning it inward so that its inner face is roughly a tangent to the dome.

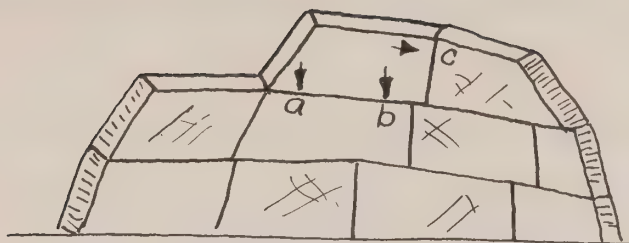
Even at this early stage, the block might fall in, except that it is supported by the face of the notch and the top of the previous blocks.



The block must bear only at areas A, B and C. It should not bear at D or E or it will pivot and slip. All blocks from this point on, until the key block, are set in this manner.

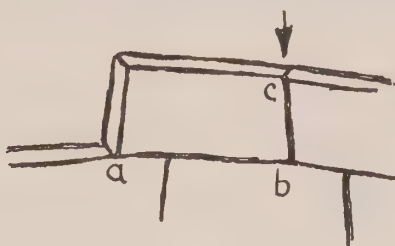
Continue cutting blocks from within the igloo circle, fitting them as you go. Don't use blocks less than two feet long or eighteen inches wide if you can help it. Lay small blocks aside for later use in snow bench and doorway building. The slope of the block, which of course governs the shape of the igloo, is estimated by eye. The block is raised into place and the joints are trimmed until the block settles into position.

When the third row is under construction, the slope will be great enough to make careful fitting essential. Each block bears in the same three positions only. The remainder of the joint can gape wide, or almost touch, but these three faces must carry the load to jam in the block.



The tendency to rotate inward around A-B is resisted by pressure between the upper third of the faces of the new block and the previous block. This face must be radial to the igloo centre, or the previous block may be displaced.

When fitting snow blocks on the A-B-C method described, the block should be lifted into position and the joint fitted roughly, with the faces in contact and the block supported by the left hand. If the snow saw-knife is run between the new block and the previous one to make them fit, then a slight undercut on the under face at the end nearest the previous block will leave the joint supported at A and C only.



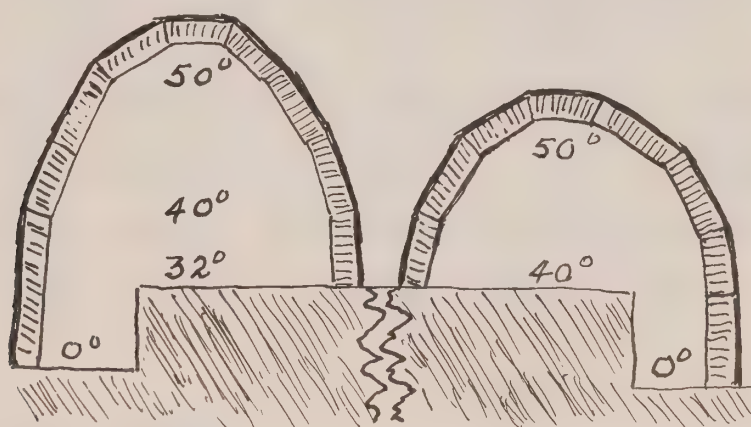
A firm tap downward at C as shown by the arrow will drive the block into final position, seating at A, B and C, when it need no longer be supported.

Carry on building, block by block. You will find that the increasing slope of the igloo wall will of course increase the tendency for the block to fall in, but this is compensated by the increasing angle between the A-B axis of the successive blocks as the diameter of the opening decreases. Building

actually becomes easier toward the finish, as the blocks will jam firmly into place.

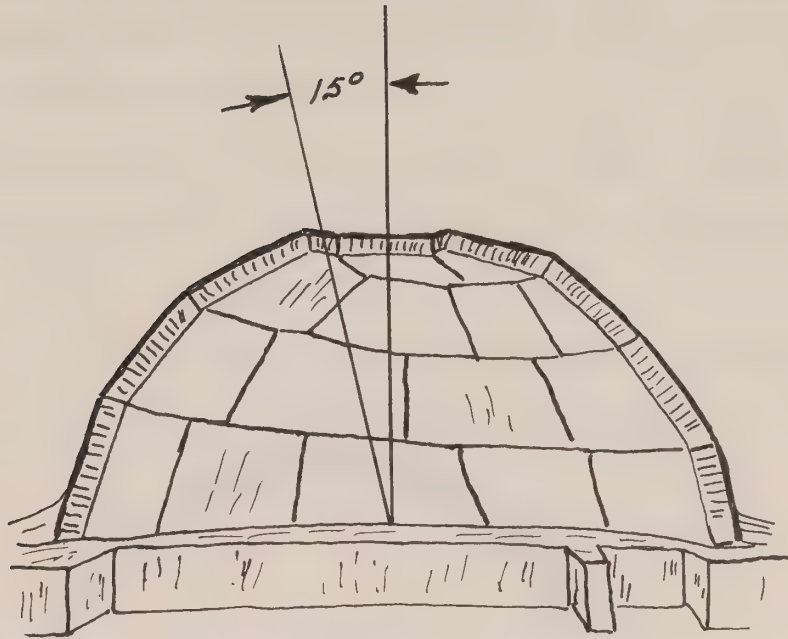
When you run out of snow block snow inside the igloo, cautiously cut a small door as far down the wall as you can, tunnelling underneath to make enough space for the outside workers to push in more building blocks.

Try to keep the curve of the walls symmetrical and avoid a pointed igloo, because the high ceiling would reach the limiting warmth before the sleeping bench gets its share of heat.



It is surprising how flat an arch can be built, using the spiral technique. The last few blocks will be almost horizontal, but if you remember the A-B-C fit, they won't fall.

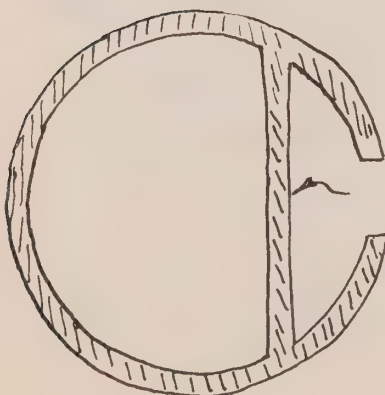
When the remaining hole in the roof is small enough to permit doing so, a key block is fitted. After what you have been doing, this is easy. The edges of the hole should be bevelled at about 15 degrees from the vertical.



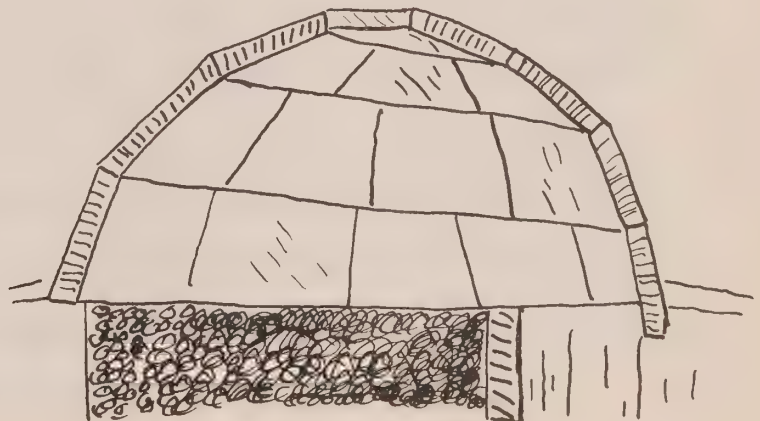
The hole should be longer than it is wide, to permit passing the key block up through, then juggling it into position. This is tricky, but not as difficult as it may appear. By judicious use of your snow knife, cut away the block, letting it settle slowly into position. You have built your igloo!

Making the Igloo Habitable

Across the floor, about one third of the way back from the door, build a snow wall about 20 inches high to conserve warmth.



Snow wall



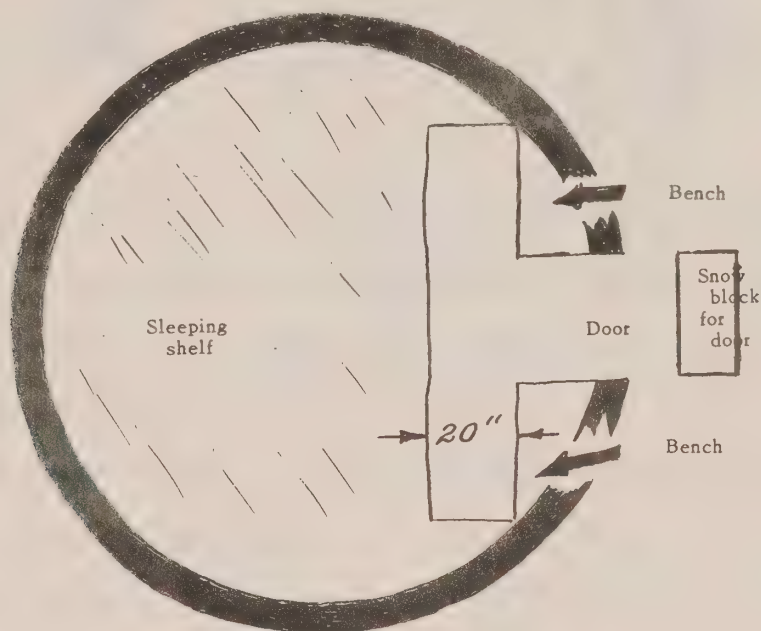
Cross-section of sleeping area

This will form the front of your sleeping shelf, which will raise you into the warm air trapped above the door.

Shove all the loose snow in the igloo behind the wall to form the shelf.

Break up lumps and blocks to soften the bench and to provide better insulation. Level the bench top carefully.

At each side of the door leave or erect little benches allowing about 20 inches of leg room between the sleeping shelf and bench.

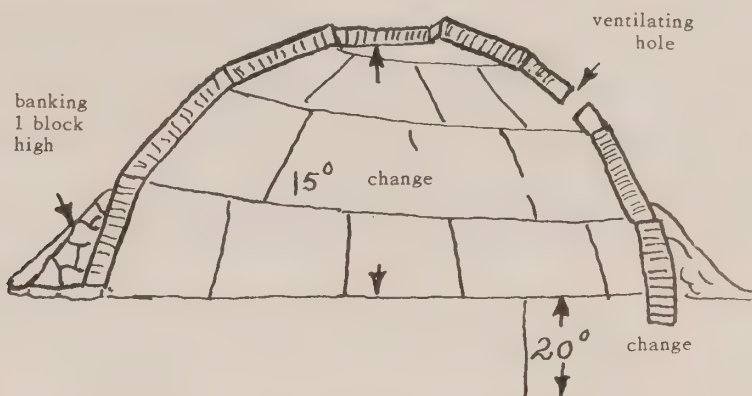


Plan of igloo

This is the kitchen and heating area. It must be reasonably close to the bench to permit the cook and lamp tender to reach it without rising from the sleeping bench on which he is sitting.

Chink the dome of the igloo carefully with powder snow, which when packed firmly into the open seams will soon harden and stop loss of warm air from the igloo. If you plan a short stay, chink only the outer seams, but for a better job do both inside and outside joints.

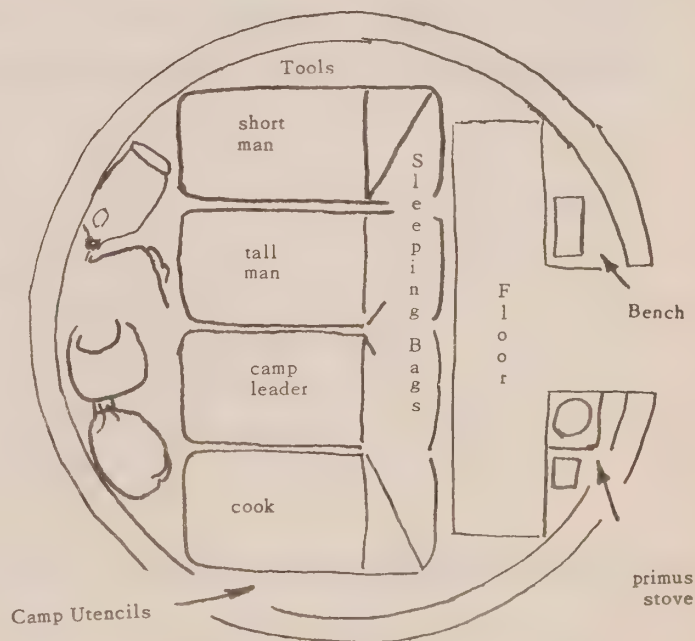
You may throw loose powdery snow on top of the igloo to act as chinking, but not so much as to add to the weight of the roof. You may bank the bottom row of blocks to prevent wind driven snow from causing erosion.



If a high wind is blowing, the drifting snow can erode the wall of the igloo very rapidly. A snow wall should be erected to act as a wind-break, and any broken blocks can be piled against the windward wall to protect it from the cutting effect of the drift.

Now, with the igloo chinked, the door cut in and the sleeping bench completed, all you need to do before moving in is to clear out all loose snow.

The bench is first covered with caribou skins (or other insulation) and the sleeping bags are then unrolled and placed, heads to the entrance, side by side. All snow and frost must be removed from hides, bedding, and clothing before they are placed on the sleeping bench.



Floor plan of igloo

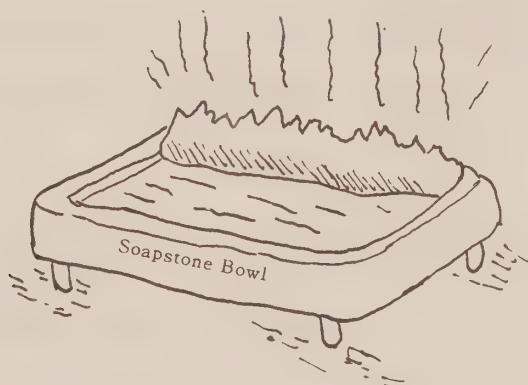
Pots can be suspended from pegs driven firmly into the walls above the fat lamp (koolik) or the primus stove (koodlik).

Drying racks made by forcing sticks into the walls, above the heat sources will serve the following purposes:

- (a) Drying of clothing from which all snow, ice, and frost have first been scraped. Never melt snow on garments - always scrape it off.
- (b) Thawing of frozen rations which do not need cooking. This requires quite a long time.
- (c) Protection of the igloo wall and roof from melting.

Koolik

The Eskimo fat burning lamp, or koolik, has provided heat for comfort and cooking for thousands of years, giving a quiet and pleasant light and warmth to the native home. Properly tended it does not smoke or smell, and it can be controlled to give more or less heat on demand. It is carved laboriously from soap-stone in the form of a shallow pan of half-moon shape. The Straight edge of the lamp was bevelled to support the wick, made of arctic cotton or moss.



Seal oil or caribou fat is used as fuel. To avoid its melting into the snow shelf and to keep it warm enough to render fat, it is supported on short sticks driven into the shelf.

Some Rules for Living in an Igloo

Persons entering the igloo for a stay of longer than an hour or so, after removing mukluks and snow from garments, should get up on the sleeping bench, out of the way.

The cook, usually at the right-hand bench, has the primus stove, under which is a piece of cardboard from a ration box to prevent it from melting into the shelf and tipping. He may also have a koolik, if fat is available, for slow cooking.

One person should be responsible for adequate ventilation - keeping the vent holes in the dome and door open enough to avoid risk without freezing the occupants. Carbon monoxide is insidious and dangerous.

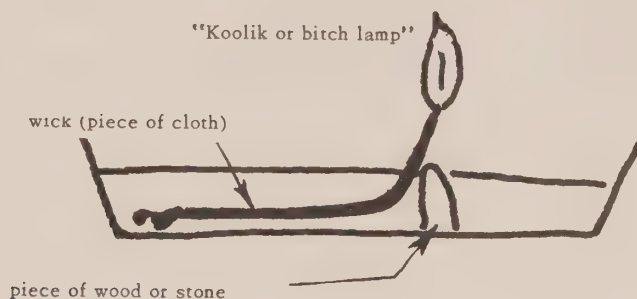
During the day the door is left open. At night it is closed by a snow block which should be chinked and a ventilating hole three inches to six inches in diameter bored through the upper part. The more fumes being generated, the larger must be the aperture. Don't wait until the lamp won't burn properly and you begin to feel groggy before letting in air. It is dangerous, and it isn't necessary at all. If the roof hole does not draw properly because of wind, a snow chimney can be made by setting a perforated block over the hole.

Now that you are in residence, the igloo will warm up rapidly. If the inner walls start to glaze, with ice, and drip, you are overheating. Take corrective action before icing develops; cut down the heat if you must.

Frying, baking or broiling have no place in igloo living. Boiling and stewing are easier and prove very satisfactory. Canned goods may be heated in the can

by bringing them unopened to a boil in a pot of water which completely covers them. Use the pressure cooker or a tightly covered pot to avoid steam. Never place an unopened can over direct heat!

Two good meals a day, breakfast and the main meal in the evening, avoid loss of the working day. A snack at noon will not bring activity to a halt for more than an hour or so. Body heat is derived from food intake, so eat all your ration and supplement with fish whenever possible. Eat fats rather than burn them if the supply is low. A diet of meat is good for you. Vilhjalmur Stefansson lived for a full year on meat alone to prove this point. If you are forced to live solely on the products of the chase, you must eat flesh, fat, liver and every edible part, to ensure that you don't suffer from dietetic deficiencies.



You can improvise a fat lamp out of any flat pan, such as a ration can. If you have fat to burn, all that is required is a piece of heavy cotton, linen cloth, or absorbent cotton for a wick and a sloping ramp to support it. You can burn lubricating oil in a fat lamp, but the flame will smoke more readily and the wick will have to be trimmed more carefully to keep the flame below the smoking point. When the level of the oil drops, the flame may follow it

down the wick, causing further smoking. A simple damper, made of the tin foil from a gum wrapper or a piece of sheet metal, will prevent this, and will permit closer control of the flame. A few drops of aircraft fuel used with caution will aid in lighting the wick. Never try to burn a volatile fuel in the koolik - you would be far too successful, and you might find yourself in trouble. Don't be the first man to burn down an igloo!

The left-hand men remain on the bench, assisting in cooking and maintaining their koolik. If this lamp is burning animal fat, it requires only moderate attention. Lubricating oil is not so easily used, as the flame smokes easily and the wick needs more frequent attention. A little animal fat dissolved in the lubricating oil makes a big improvement in the flame. If the group finds the igloo cluttered with odds and ends not needed at the moment, a miniature igloo can be built against the outside wall, and a doorway out through to form a cache. Keep the entrance low to avoid loss of heat.

Uses of Compass

The Silva Prospector is the compass referred to below. It may be used as a protractor or as a compass.

Using the Compass as a Protractor

Draw a straight line along your desired direction of travel indicating A as the present location and B as the intended destination. This line is your required track.

Place the compass along this track as shown in Figure 1.

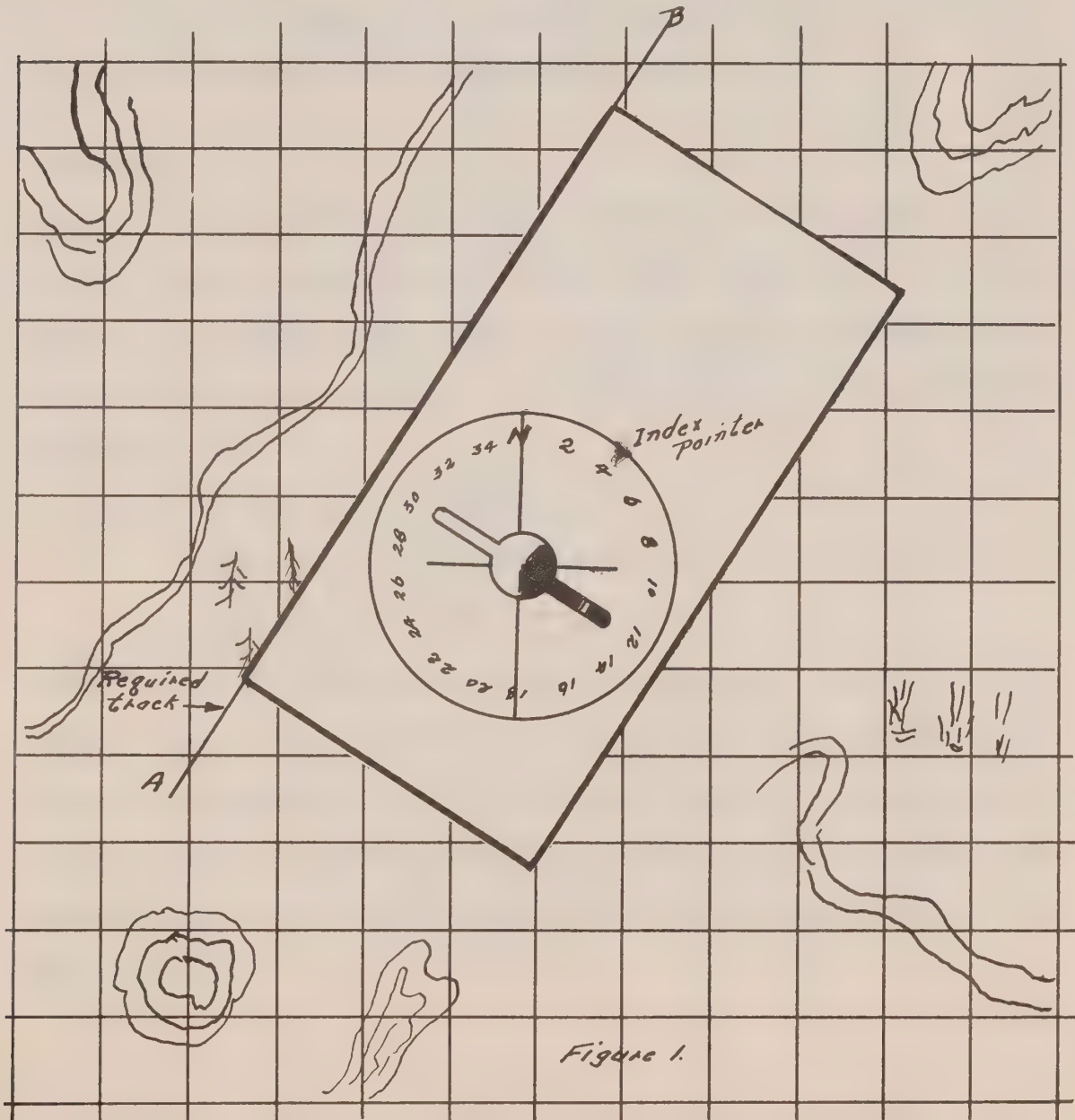


Figure 1.

Rotate the compass housing until the compass meridian lines on the transparent compass face are parallel to the meridian lines of the map and north (N) points to true north on the map as in Figure 1.

The Compass face is marked off around the perimeter in 2 degree intervals represented by a short line, a larger line every 10 degrees, and Arabic numbers every 20 degrees. The number 2 represents 020 degrees, and number 4 represents 040 degrees, number 26 represents 260 degrees, and so on with north (N) representing 360 degrees.

Now read off your required track opposite the index pointer. In figure 1, your required track would be approximately 040 true.

Variation

You now have the required track true. In order to travel along this required track, you must allow for local magnetic variation. In other words, you must compensate for the angle between true north and magnetic north. Variation will be either easterly or westerly and is always indicated on topographic maps.

A good rule for applying variation is:

Variation east - magnetic least; and

Variation west - magnetic best.

Example. Figure 1 indicates that your required track from A to B is 040 degrees true. Let us assume that the local variation is 20 degrees east. Therefore, according to our rule, we would subtract 20 degrees easterly variation from our required track true of 040 degrees. This gives us a magnetic heading of 020 degrees which is set on the compass opposite the index pointer.

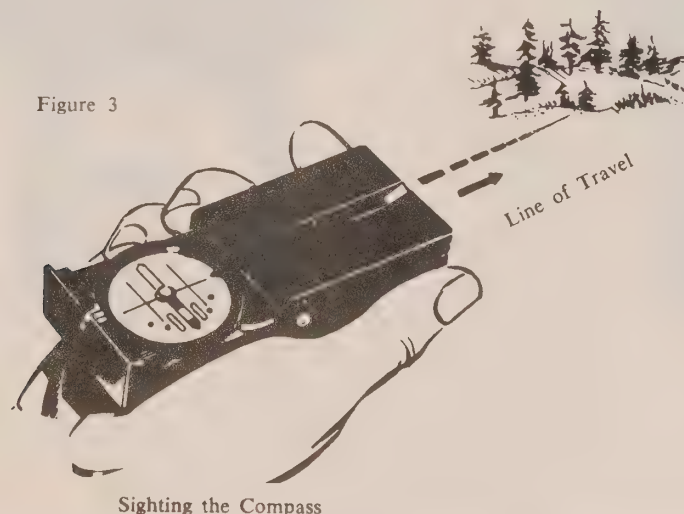


Figure 2

How to Use the Compass

With the magnetic heading established and set on the compass it is now ready for travel.

With the compass held in your hand turn yourself around until the "Red End" or north seeking pole is pointing to north (N) on the compass face and the magnetic needle is parallel to the two luminous lines.



Sighting the Compass

Sighting the Compass

The compass is now pointing along the required track and a sighting line may be obtained as illustrated in Figure 3.

The magnetic needle is read between the two luminous compass orienting lines by its reflection in the sighting mirror. In using the sighting mirror, you can see that, when the needle is oriented between the two parallel lines, it appears to be closer to one line than it is to the other. This would give the impression that it is not exactly in the centre (Figure 4). However, this is easily explained. The mirror, slanted as it is at a 41 degree angle, influences the reflection according to the laws of parallax. In using the sighting mirror, therefore, parallel the needle with the orienting line which appears nearest to it, and accurate results will follow. Be sure to level the compass while using the sighting mirror.

RIGHT

The magnetic needle is closer to one of the lines than it is to the other

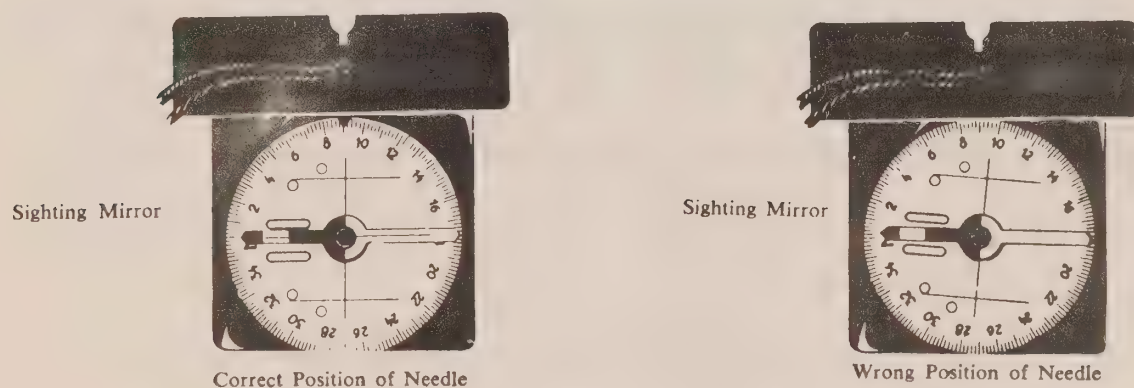


Figure 4

WRONG

The magnetic needle appears to be centred between the two luminous lines, but is not parallel to them.

Choose a landmark to which the sighting line points (rock, tree, etc).
 Walk directly to that landmark. When you have arrived at your landmark,
 sight again, choose a new landmark or target, and travel to it as before.
 By moving from new landmark to new landmark, you will describe a straight
 path through the country-side to your destination.

Measurement of Distance

A simple means of determining distance would be an asset at times, when
 walking, eg. :-

- (a) to make a dogleg detour in order to resume track on the opposite side
 of an obstacle;
- (b) to orient oneself on the ground to a 16 mile/1 inch map is not easy -
 relating actual distances on the ground to scaled distances on the
 map will simplify the task of interpreting the map.

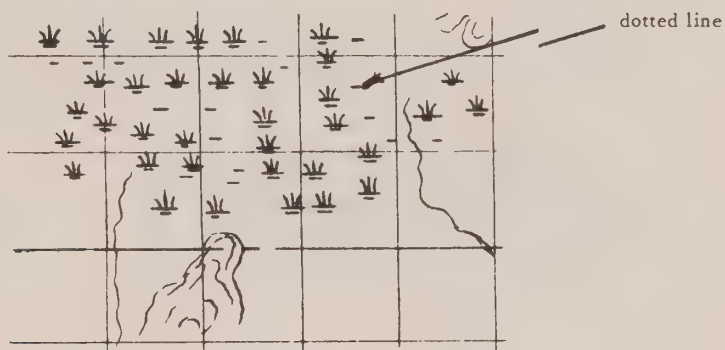
One method of estimating distance is the tally and pace system. It is based
 on the 30 inch pace which is adopted for normally walking. This is neither
 a long nor a short pace for most people. It is a pace which you probably
 use every day.

1 pace	= 30 inches
1 double pace (i.e., each time the same foot touches the ground)	= 60 inches = 5 feet
66 double paces	= 330 feet = 1 tally (tie knot in a string for each tally)
16 tallies	= 5,280 feet = 1 mile

Map Reading

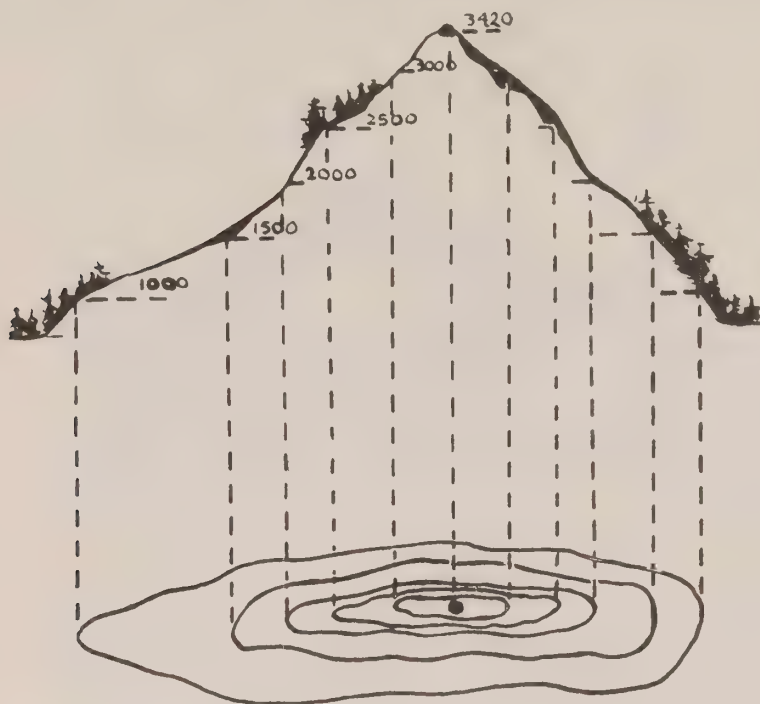
While it may not be possible for you to learn all the symbols shown on various maps, it is as well to know those which indicate difficult or impossible travel or aid locations. Generally speaking these are as follows:

- (a) Swamps or Marshes. The dotted lines indicate that the exact shore line of the marsh or swamp is not known.



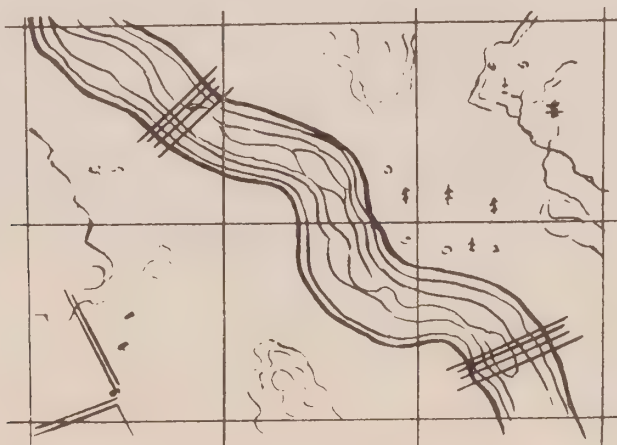
- (b) Undulating Country. The height of the ground is indicated by a continuous line joining all points of equal height. The variation in height will differ depending on the scale of the map and the terrain which it covers.

This shows that a steep slope is represented by contour lines close together while a shallow slope has contour lines far apart.



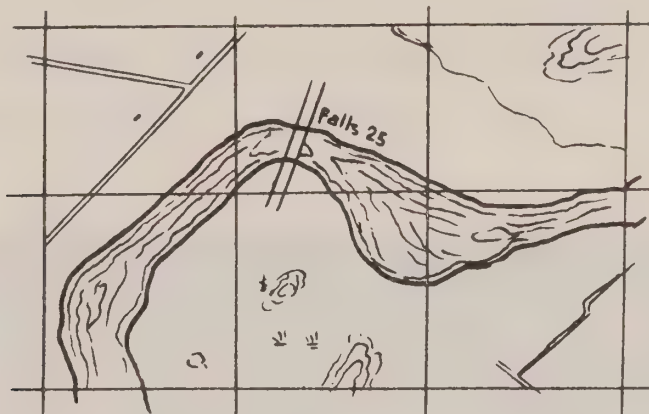
Contour Lines

(c) Rapids. These are shown as a series of light lines drawn across the river covering the area in which the rapids occur. They are usually marked only on navigable rivers.



Rapids

- (d) Falls. These are generally shown as a light double line drawn directly across a river, with the word "falls" written alongside, and a figure indicating the drop in feet.



Falls

- (e) Trails. These are usually shown as dotted lines, either single or double. A single line usually denotes a pack trail, while double lines usually indicate a trail used by wagons or tractors.
- (f) Cabins. Ranger stations, etc., are marked as black squares with "Cabin", "Mission, or "Lookout Tower" written alongside. Trading posts are shown as black squares with TR written alongside.

It is best to remember that the shortest distance between two points is not necessarily the quickest route. Pick your route carefully to give you easy walking conditions, even if it does add a few miles to the trip. It will pay off in the long run.

Finding Direction without a Compass

Three methods of finding North are discussed here.

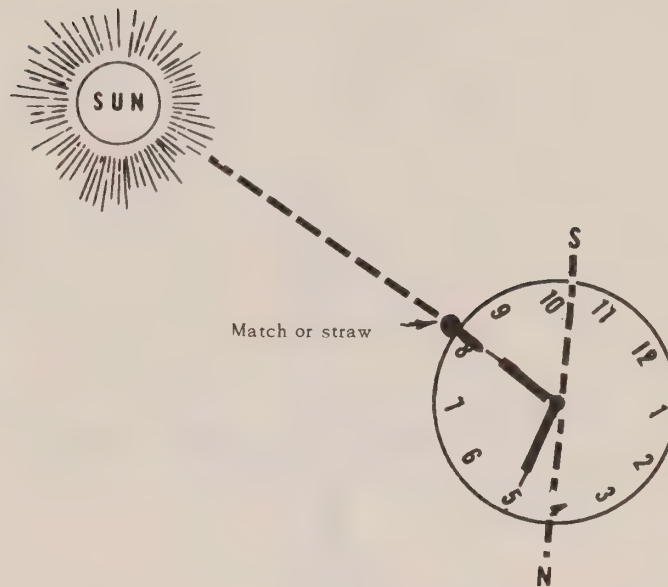
- (a) The first, by using the pole-star, is the easiest. Having found the pole-star, simply face it and you are facing North. To find the pole-star, the Big Dipper or Plough is used.



The Big Dipper and Pole-Star

- (b) The second method using the sun and a watch to find true North. Hold the watch flat in the hand. Place a match or straw upright along the edge of the watch. Turn the watch until the shadow of the match falls directly along the hour hand, that is, until the hour hand points directly at the sun. Between the hours of 6 A.M. and 6 P.M. (standard time) a line from the center of the watch, dividing the small angle between the hour hand and the figure 12 will point SOUTH.

Between 6 P.M. and 6 A.M. divide the large angle to find SOUTH.

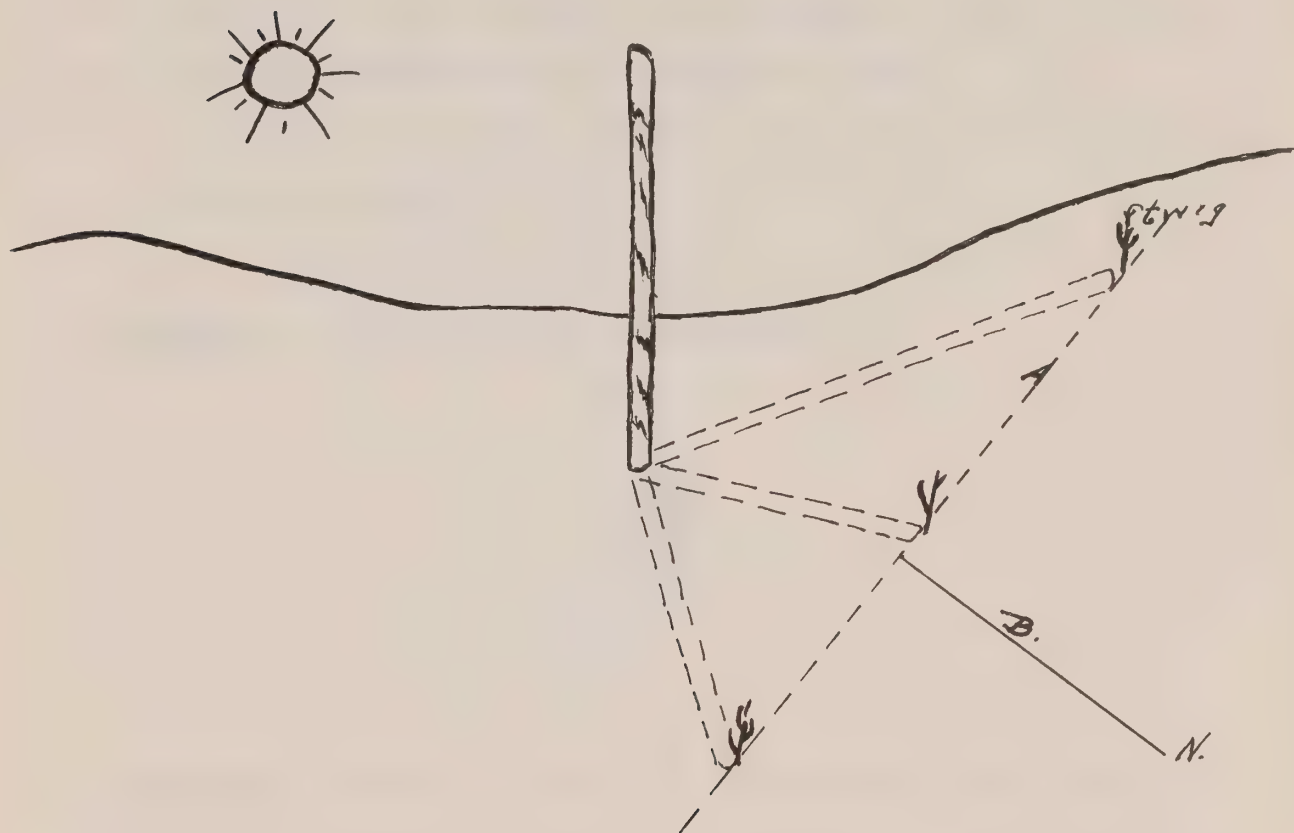


Using the Sun and a Watch to Determine a North-South Line

Remember, in the Arctic when the sun is up all day, any confusion between 12 and midnight and 12 noon could cause a 180 degree error in direction. In the example shown above, had the observation been at 8 P.M. rather than 8 A.M., the direction would be reversed. Make certain your watch is on standard time when taking readings.

- (c) The third method of finding north is to place a long stick in the ground, and as the sun progresses place shorter twigs in the ground at the end of the shadows at intervals of fifteen minutes or more.

Draw a straight line (A) along the line of short twigs and this will indicate east and west. North will therefore be found by drawing a line (B) at right angles to line (A).



Knots

A few of the various knots will be of value to a person attempting to survive in the North. There are four basic requirements for knots:

- (1) They must be easy to tie and untie.
- (2) They can be tied if necessary in the middle of a length of rope.
- (3) They can be tied when the rope is under tension.
- (4) They can be tied in such a fashion that the rope will not cut itself when under strain.

THUMB KNOT - prevents the rope from twisting.



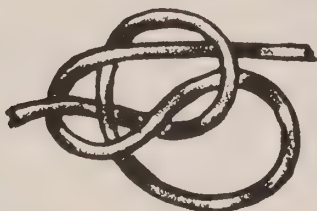
FIGURE EIGHT - prevents the rope from being pulled through a loop.



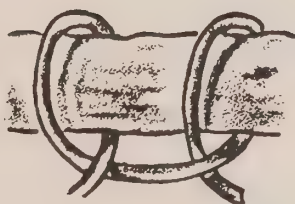
REEF KNOT - for joining two ropes of the same diameter.



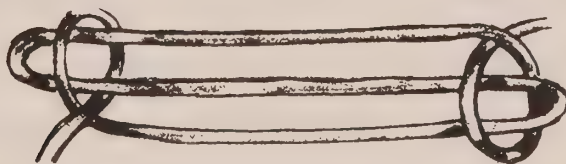
BOWLINE - for making a non-slip loop at the end of the rope.



CLOVE HITCH - used in mooring boats.



SHEEP SHANK - is used for shortening a rope that is tied at both ends.



Food and Water

The needs of a survivor of downed aircraft or a person lost are first aid, suitable shelter and preparation of signals to aid in their rescue. Within two days these needs should be attended to while the person or persons still have plenty of body energy. But, no matter how good the shelter or preparations have been a person requires water and food to survive for more than a few days.

Water

Water is more necessary to human existence than food. Do not drink sea water as it increases your thirst.

Summer Water Sources

Spring water or fast running water is best but any running water or that from properly drained lakes in isolated areas will be safe.

Sometimes when surface water cannot be procured, water can be obtained by digging into moist soil usually in low ground.

Other sources are the sap layer of trees such as birch and maple in the spring; dew on plants, rain water and fish juices.

Winter Water Sources

If open water cannot be found, use ice instead of snow. However, hard snow will produce more water than soft fluffy snow. This can be overcome by packing it and then melting. Avoid eating snow as it tends to dehydrate the body.

DO NOT EVER DRINK WATER UNTIL CERTAIN OF ITS PURITY.

Purification of Water

Boil three to five minutes and shake afterwards to restore the oxygen.

Food

Natural Food

Every effort should be made to discover and obtain natural foods within the area so as to conserve your energy.

Plant Life

Most green plants are a potential source of Vitamin C such as rose hips (the buds of wild roses). Tea can be made by pouring boiling water over labrador tea leaves, spruce tips, willow tips and dandelion leaves.

Anything that is not bitter or anything eaten by birds and animals is probably but not necessarily safe to eat. If doubtful, take minute quantities at first and wait twenty-four hours for a reaction.

Poisonous Plants

There are no poisonous plants north of the tree-line. However south of the tree-line there are three which can be mistaken for edible plants and can cause death.

(a) Water Hemlock -

It grows two to four feet tall. It is the most poisonous plant in Canada. It is a member of the carrot family and has toothed three-part purple streaked leaves which emit a disagreeable odour when crushed and hollow tube-like roots which emit a parsnip-like odour. It could be easily confused with Cow Parsnip which is edible.

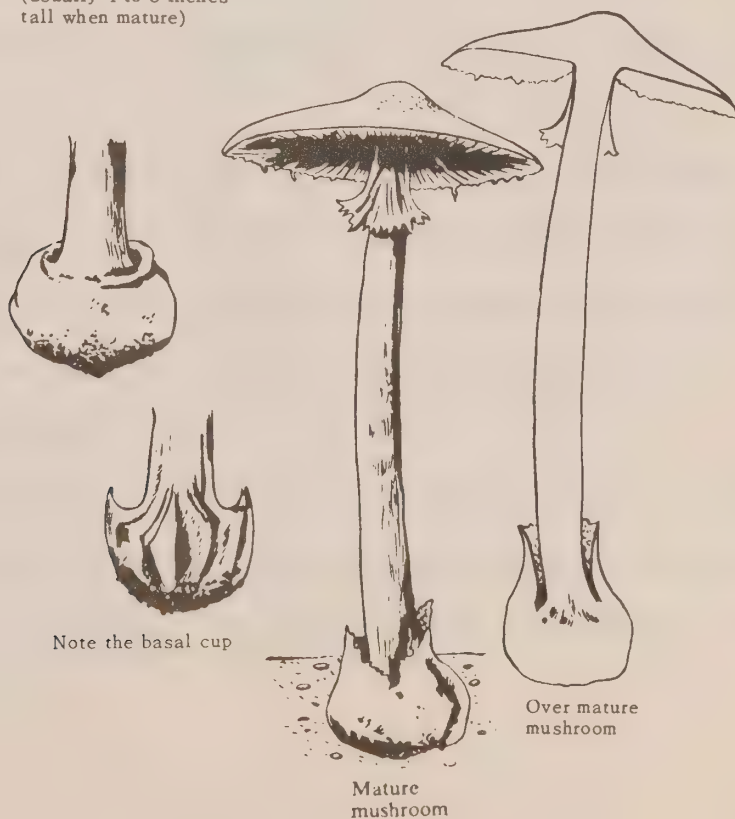


Leaves and
Flowers

(b) Death Cup Mushroom -

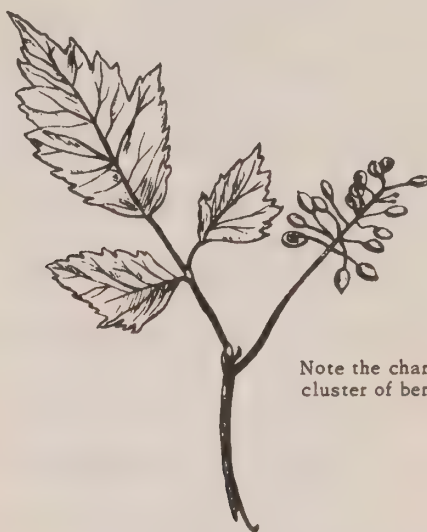
This mushroom is found in the wooded areas of northern Canada. It is indistinguishable when young, but in maturity has a soft white cup-line formation at the base and a broad collar-like ring part way up the stem. Avoid all mushrooms having this structure and also mushrooms in the button stage. It has been confused with the common edible mushroom.

Death Cup Mushroom
(usually 4 to 6 inches
tall when mature)



(c) Baneberry -

This is a bushy perennial, two or three feet tall with small white flowers in a short thick terminal cluster. Red or white berries replace the flowers and resemble dolls' eyes in appearance. The root stalk is substantial. Avoid berries growing in clusters of this type.



Note the characteristics terminal cluster of berries

Red or White Baneberry

Edible Plants

- (a) Flowers of most plants in Canada are safe to eat either boiled or raw.
- (b) Greens such as dandelion leaves will provide roughage and vitamins. These can be eaten raw or boiled. Some delicious edible greens are: bracken fronds or fiddleheads, the lower tender inner twelve inches of cat-tail or bulrush stalks, young green milkweed pods, young water-lily pods and pigweed.
- (c) Roots such as cat-tail, wild carrot and liquorice will provide starch and protein. The roots of the cat-tail is obtainable in both winter and summer and are best boiled. Other common delicious edible roots

are bracken, vetch, tiger-lily, ladys' slippers and the tubers of the arrowhead plant.

- (d) Berries. The edible berries are too numerous to mention. Blue and black berries not in clusters are generally safe. Red and white berries should be avoided unless positively identified to be safe.
- (e) Lichens. These are dry scale-like plants, usually found on rocks or old stumps in both the Arctic and wooded areas. They can be boiled and dried, then ground into a powder and stewed for use as a soup thickener. A common edible lichen is the lemon lichen.
- (f) Mushrooms. Although some mushrooms are edible, delicious and filling they are not particularly high in nourishment and since some are extremely poisonous they should be left alone unless positively identified as being edible.
- (g) Leaves. The leaves of labrador tea, a shrub-like growth on practically all muskeg areas in Canada, can be steeped to produce a stimulating beverage.
- (h) Trees. Sap from trees, such as the maple, basswood, birch and poplar, is a source of water with some food value particularly in the spring of the year. At other times the cambium or succulent new growth between the wood and the bark of such common trees as poplar and jack pine can be scraped into a container to produce a pulpy residue which is tasty, nourishing and containing vitamin C.

Lichens

There are many varieties of lichens which can be eaten. Some can be nibbled raw but they are generally acidic and should be soaked in water for several hours then removed, dried, and crumbled, before boiling to a gelatinous consistency. May be used effectively in thickening soups, stews, etc., or as a broth.



Bracken



Rootstalks are nutritious but quite woody. Roast or boil.



Lamb's Quarters or Pigweed

Common throughout North America.
The young leaves of this plant make
an excellent green. Boil like spinach.

Labrador Tea



Widely distributed. Leaves make an
aromatic beverage somewhat like Chin-
ese tea. Dry the leaves over fire in a
pan until they become crumbly. The
infusion is prepared by pouring boiling
water over the leaves. The resultant brew
is high in vitamin "C".



Stinging Nettle

The leaves of the young plant make an
excellent green. The bristled leaves and
stems of the mature nettle produce a
rash upon contact with the skin.
Crushed dock leaves make an effective
remedy for nettle stings.



Cow Parsnip
Young leaves and flower stalks make a
sweet green. Eat raw or boiled.



Liquorice Root

A vetch-like plant found in the northern forests and on the tundra. The flowers are pink-purple and look somewhat like pea blossoms. The roots are quite substantial and can be eaten raw or boiled.



Woolly Lousewort

The roots and young flowering stems may be eaten raw or boiled. A common perennial of the arctic tundra, up to eight inches in height.



Silver-Weed

Has widespread distribution. The roots are a perfectly acceptable food when boiled or roasted.



Tiger-lily or Turk's Cap Lily

Has a brown spotted orange flower. After peeling, the roots may be boiled or eaten raw.



Lady's Slipper

The roots may be boiled or eaten raw.



Pond Lily

Widely distributed, the roots may be eaten if peeled and boiled. The seed pods are best when newly formed. Boil in two changes of water.



Cat-tail

Grows in marshy or wet ground. The flowering head is edible when young and green. Boil like asparagus.

The white succulent inner portion of the lower 12 to 15 inches of stem is widely used as food. Boil or eat raw.

Roots may be baked, boiled, or roasted. If woody, chew and swallow the starchy material. Spit out the residue.



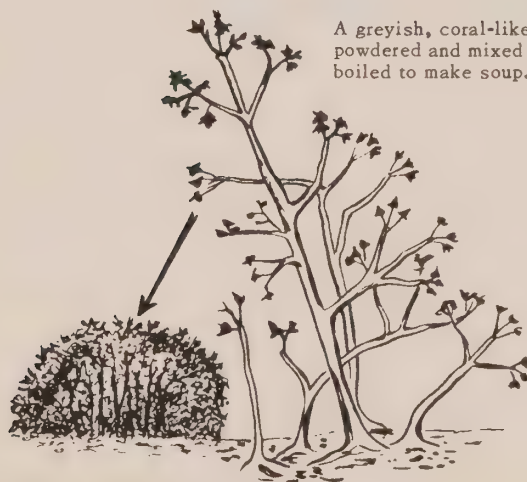
Nutgrass

Has a three-angled stem and grows in low ground near water.

Peel the root and eat raw or boiled. (Better boiled.)

The Ground Nut may be used in a similar manner.

Reindeer-Moss



A greyish, coral-like plant. Can be powdered and mixed with flour, or boiled to make soup.



Dandelion

The leaves are an excellent green. The dried, ground-up roots make a substitute for chicory which is a substitute for coffee.

Insects

Grasshoppers or locusts

These are considered to be a delicacy in many countries. It is best to remove the wings and legs and toast the body on a stick.

Grubs

The white wood burrowing larvae of beetles, are usually found in rotten logs. Remove the head, thorax and legs and eat. The eggs are edible if enough can be procured but are dry and tasteless.

Snails

Both aquatic and terrestrial snails are an excellent source of nourishment when obtainable.

Earthworms

The large types particularly, are eaten in many countries.

Reptiles

Lizards, frogs, snakes and turtles are all exceptionally tasty whether boiled or fried.

Game Meat

All Canadian birds and animals are edible except the livers of polar bear and bearded seal. These have an excessive vitamin A content which produces a tonic reaction.

Dressing Game

Some birds, such as ptarmigan and the various species of grouse, can be skinned using the fingers only. Break the skin on the breastbone and work around the body. Sea birds such as gulls, fish-eating ducks should be skinned to diminish the fishy taste. The craw or first stomach should

always be checked as the content is not digested and may provide nutritious foods, such as buds, berries and seeds which can be eaten.

Large animals which are too large to elevate may be skinned by starting in the centre of the stomach and skinning to the centre of the back. Spread the skin out on the ground to protect the meat and roll the animal over and skin the other side. All internal organs should be removed immediately to prevent bloating. Big game is usually bled out by the bullet which kills it; however, it is advisable to cut the jugular vein after killing to assure thorough bleeding, hence better tasting and keeping of meat.

Big game is more easily utilized when it has been cut up into manageable chunks. Heart, liver and kidneys of all game can be used except as previously mentioned. In the removal of the liver, be careful and not break the gall sack. Incidentally, there is no gall sack in deer or other antlered game.

Hunting and Fishing

Animal food will give you the most food value per pound. Anything that creeps, crawls, swims or flies is a possible source of food.

To the majority, hunting implies the use of the gun, but there are other productive methods of taking game. The survivor should plan to use every means at his disposal favouring those which will require the least effort to achieve results.

Snares, traps, gill-nets and set lines will work for you day and night.

Get them into operation as soon as possible. Make use of any available material and improvise. Scout the area of your landing early to learn its game potential. Tackle the job systematically.

Before departing, establish a base line or check points by which you can always orient yourself in relation to your camp. This could be a river, a lake shore, hill or even a blazed trail north and south to your camp.

Hunting Hints

1. Walk as quietly as possible.
2. Move slowly, stop frequently and listen.
3. Look around.
4. Hunt upwind or crosswind whenever possible.
5. Blend with terrain features as much as possible. Do not stand against the skyline or break from cover without thorough observation.
6. Be prepared - game frequently startles the hunter or catches him off guard.

Watch for:

1. The animal itself - don't get excited when you see it; very often it isn't certain what you are and will remain still. Make all movements slowly and make the first shot count.
2. Trails - usually beaten down through heavy usage. If recently used, these trails are excellent for setting snares.
3. Tracks - may provide a wealth of information such as: the type, size, age and sex of the animal; the direction taken; the age of tracks and whether the animal was frightened.
4. Droppings - the best indication of what the animal has passed;

will sometimes reveal favourite roosting spots of birds.

5. Feeding grounds, water-holes and salt licks are good locations for hunting in the early morning or evening. Trails leading to such places may provide excellent sites for setting snares or traps.

6. Dens, holes and food stores provide good spots for setting snares.

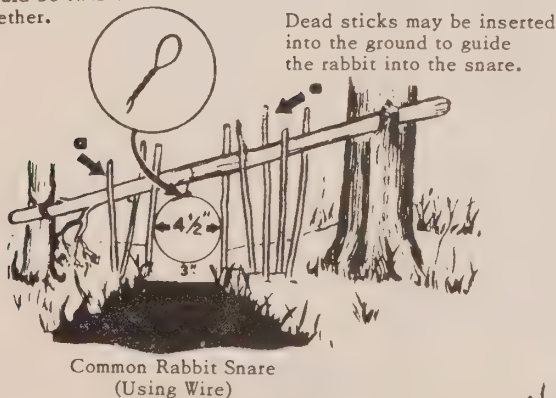
Small Game

The mainstay of the survivor, particularly if he has no rifle, will likely be small animals and birds. These are well distributed through the Canadian hinterland and may be taken without firearms.

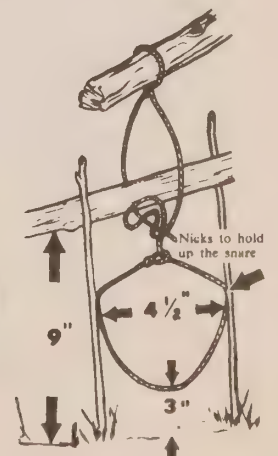
Rabbit

There are several species common in Canada. In woodlands they frequent heavy thickets. They are taken in snares set on their runways, preferably where the width of the runway is restricted by natural or man made obstacles. The balance pole snare and the common rabbit snares are shown in the diagrams.

Close-up of the loop. Wires should be twisted together.



This end should be about 4 lbs. heavier than the other end. Make certain that the balance pole will lift the rabbit clear of the ground.

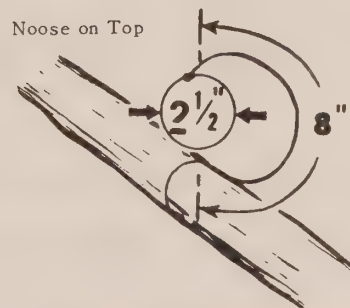
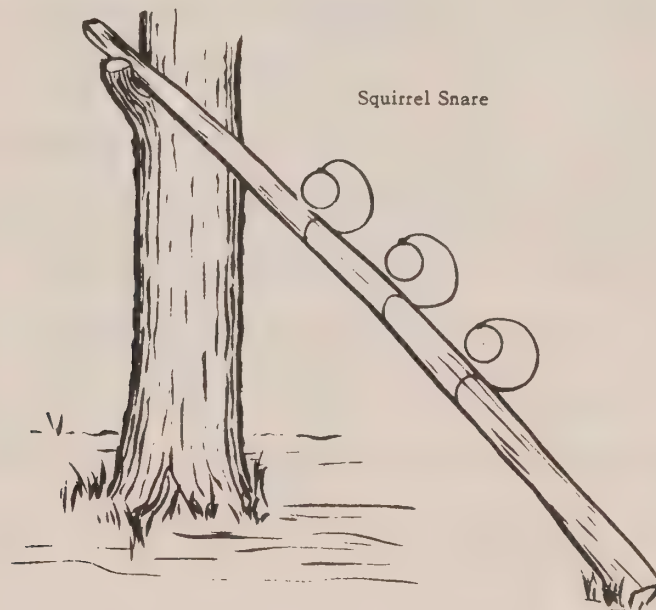


Rabbit snares should normally be 4 1/2 inches in diameter and 3 inches from the ground.

Squirrels

These are common throughout Canada's forests. They store their food in tree cavities, nests or holes in the ground but their food is of little value for human consumption.

The leaning pole snare is a simple effective method of taking squirrels. Three or more snares mounted on a pole leading to their nest or food cache will be most effective.



Mice and Lemming

These are edible and should not be overlooked by the survivor.

Porcupine

The porcupine is found in most forested areas. Watch for trees with the bark freshly stripped off fairly high above the ground. It can be killed with a club or a spear. Be careful in handling. To skin, open the hide along the belly and peel the hair back over the top of the quills. Work from the inside of the skin to prevent contact with the quills.

Mink, Martin

These are not rated as table delicacies, but if you can shoot, snare or trap them put them in the pot.

Muskrat and Beaver

The muskrat is found in pond, slough and marsh areas; the beaver along streams and lakes passing through poplar or willow country. They may be shot while swimming usually in the early morning or late evening. Beavers and muskrats usually maintain paths where snares may be placed. In early spring and late fall evidence may be found of these animals coming out from under the ice. You may cut one off from the safety of the water.

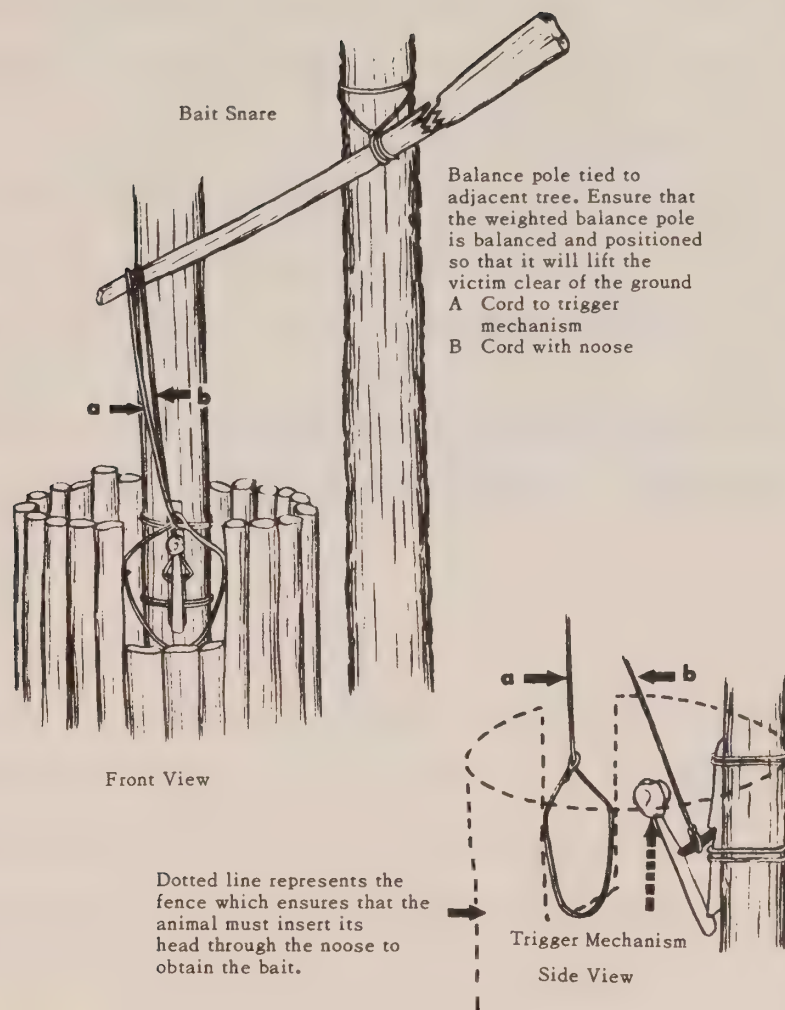
Lynx

These are seldom seen except by hunters employing tracking dogs. The meat is most palatable, not unlike tender young pork.

Fox, Wolf and Coyote

These animals will be seldom seen unless extremely hungry. Their presence in the area will be revealed by their bark. Fox can be captured by a bait snare or in the Arctic, they can be captured in a baited beehive trap.

Locate the trap on a high point as the fox usually travels over rather than around hills.



Birds

Upland Game Birds

Grouse and partridge are most often found roosting in thickets, sunning on side slopes, or feeding on the ground. Usually these birds will not fly very far when frightened and, therefore, it is better to flush them out, wait for them to land before shooting them.

If their roosting area can be found they are snared easily by using a pole with a wire noose attached to the end. Be certain and take the partridge closest to you. In this way you will not frighten the others.

Spruce grouse and the ptarmigan in the Arctic frequently remain motionless thereby seeking to avoid detection. Some may be killed by throwing sticks and rocks.

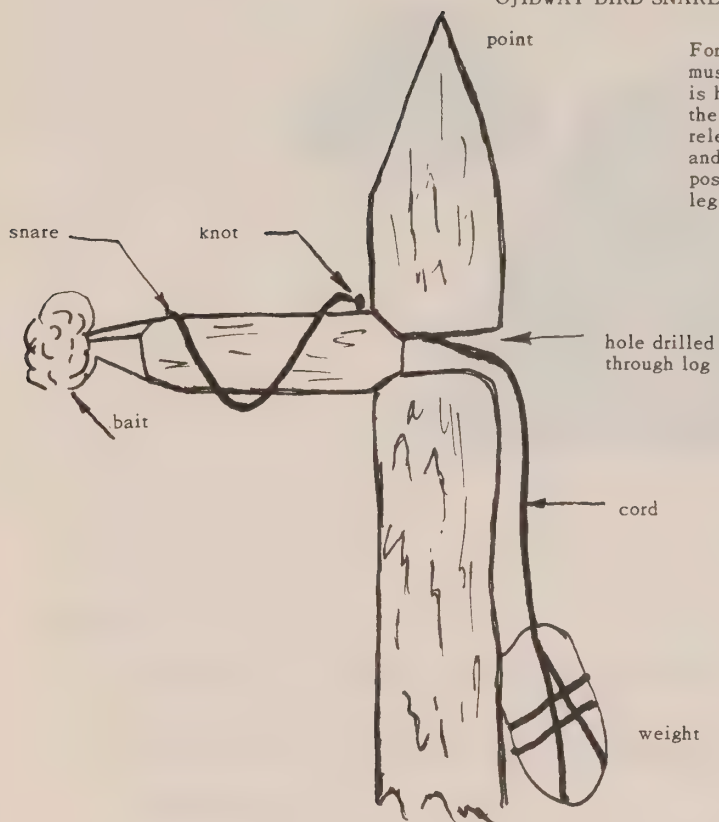
Water Fowl

Birds such as ducks, geese and coots are usually more difficult to approach than upland game. These may be shot taking into consideration the way the wind and current will take them. If geese or ducks are found during the moulting period, it may be possible to run them to the ground. Do not overlook the eggs or the very young.

Other Birds

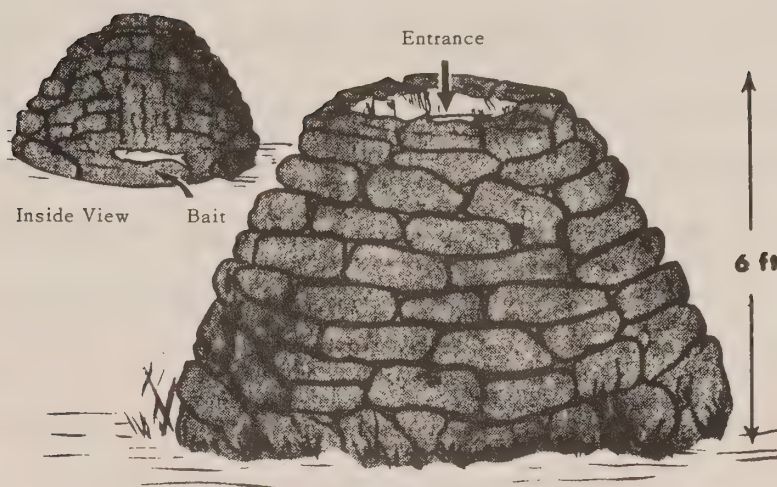
All Canadian birds are edible but do not waste ammunition for little gain. The Ojibway Snare will be quite effective in capturing many of these smaller birds

OJIBWAY BIRD SNARE



For the bird to obtain bait it must land on the perch which is held in place by tension of the knot. Weight of the bird releases the tension on the knot and the weight on the side of the post pulls snare tight on bird's legs.

Beehive Trap
Constructed from piled up rocks and stones.



Seal

The Common Jar Seal, found along most of the Arctic coastline, is an animal which the survivor may capture and from it obtain food and fuel. (blubber).

During the winter the Common Jar Seal lives under the ice and maintains open breathing holes, which are usually well hidden and covered with snow. The seal is captured here by waiting without motion until it surfaces and then shooting it in the head.

In the spring, the seal may be stalked as it suns itself on the ice. It will raise its head every minute or so to view the horizon. At this time the stalker should remain motionless. If white clothing is not available by camouflague, the stalker should crawl and slither up to the seal.

Big Game

Big game will provide food for a prolonged period, but it requires a suitable gun, skill, a large expenditure of energy and some means of preserving.

Most of the large game animals are abroad at dawn and toward evening. The dawn hunt is the best for the survivor. If he becomes lost he will have all day to find his way back to camp. If he is fortunate in obtaining game he has the remaining part of the day to dress it and begin the preservation of the meat.

The Deer Family

Deer and moose are found throughout Canada's forest zone while elk and woodland caribou are most common in Western Canada.

In summer, follow ridges overlooking open country but avoid showing yourself against the skyline. Look for salt-licks and wallows. Flies and ticks torment these animals during hot weather and they take refuge in wallows. This frantic splashing can be heard at considerable distance. Watch for game trails since most animals prefer to use these when travelling. In winter, the deer, elk and moose usually "yard up" in low lying protected areas, such as cedar swamps, willow clumps, alder swales or other thickets.

When stalking game, hunt upwind or crosswind. Avoid making a noise and stop frequently to scan the area.

If an animal starts up suddenly, remain stationary as they often return to investigate what has caused the disturbance.

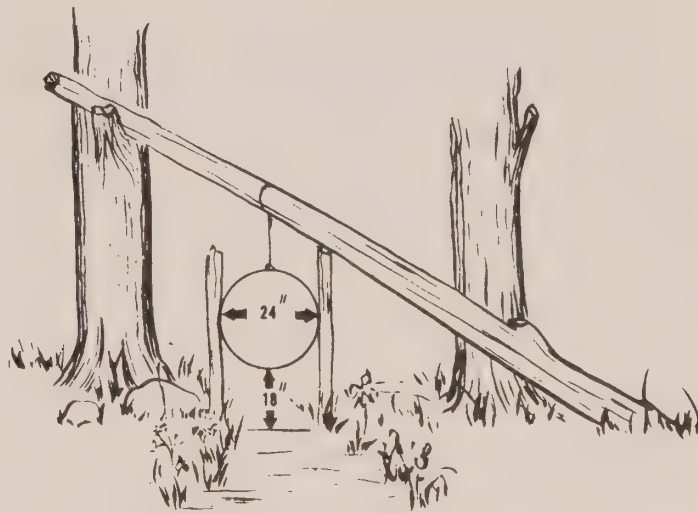
Should you wound an animal, do not follow it immediately. If you attempt

to follow, it may run for miles before dropping, but if you wait ten minutes, it may lie down after a short run and either bleed or stiffen up.

When game is taken, bleed, clean and cool as soon as possible.

Snaring

Snares may be set on well worn paths and thus save many hours of walking. A snare made of a cable or heavy wire 24 inches in diameter and suspended about 18 inches above ground should produce good results. Make certain that the snare is well anchored.



A Method of Snaring Antlered Game

Use a strong dry pole about 10 feet long and six inches in diameter.

Barren Land Caribou

Once a caribou herd is located, little trouble is experienced in shooting them particularly when migrating. Approach them low and upwind. When they are grazing in the valley, they watch the horizon.

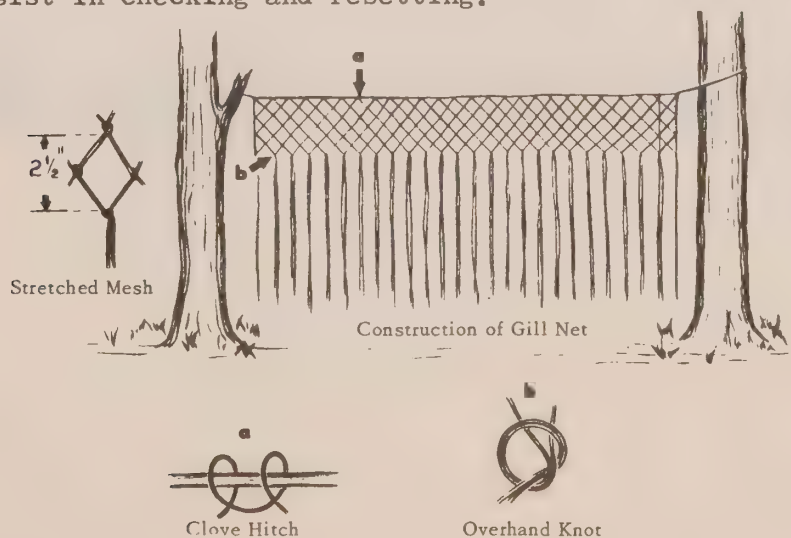
Bears

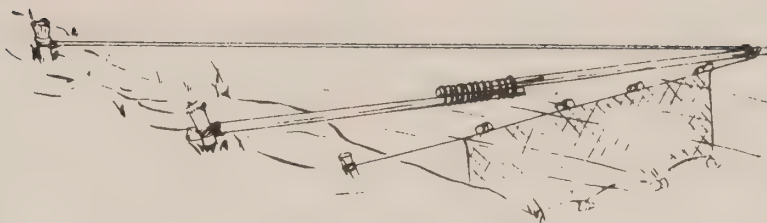
Most bears are not dangerous unless inspired or provoked. All bears may attack if wounded so it is essential to be well armed and cautious in hunting these animals.

Fishing - Netting

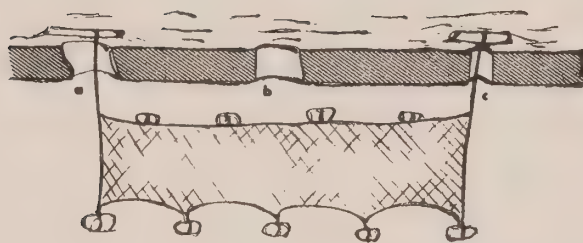
Gill netting is most effective in still water near the inlet or an outlet to a stream. Nets can be constructed using the inner cords of parachute shroud lines. The floats on the top and weights on the bottom of the net keep it vertical. When the lake is covered with ice the fish stay in a deeper area. A mesh of two and one-half inches is a good standard size.

Winter setting of the net necessitates the cutting of three holes in the ice on a lake. Make certain the net is several inches below the ice to prevent it from freezing. By using a pole slightly longer than the distance between the holes attach a line to one end. Starting at Hole "A", float the pole to "B", to "C" and remove from the water at "C". Attach the net to the end of the line and pull the pole through "A" until it is set as shown. Ensure that the line is tied at both ends of the net to assist in checking and resetting.

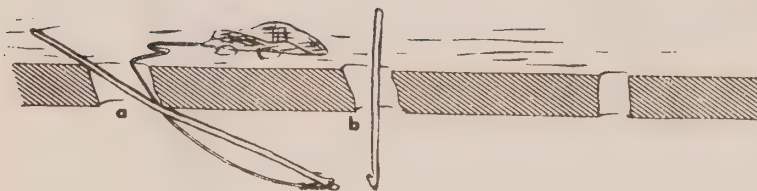




Gill net set for summer



Gill net set for winter

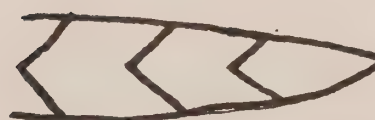
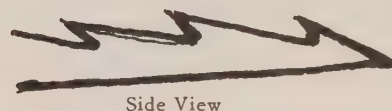


Setting the net

Spearing

Clear water is a requisite for spearing. To make a spear a $1\frac{1}{2}$ inch green pole is split for 18 inches. Tie at the end of the split and sharpen to a point. Cut the teeth as shown. Spread the tips apart with a thin twig. This is the trigger and when released the teeth come together. When not in use the twig must be released to retain the spring. This makes an excellent spear.

Along the Arctic coast, the arctic char can be attracted within spear range by bobbing a shiny object up and down.



bevel cuts for teeth

Fire-Making

You will need fire for warmth, for keeping dry, for signalling, for cooking, or for purifying water by boiling.

Don't build your fires too large. Small fires require less fuel and are easier to control; and their heat can be concentrated. In cold weather small fires arranged in a circle around an individual are much more effective than one large fire.

Prepare the location of your fire carefully. Clear away leaves, twigs, moss and dry grass, so that you don't start a grass or forest fire. If the ground is dry, scrape down to bare dirt. If the fire must be built on ice, snow or wet ground, build a platform of logs or flat stones.

Outdoor Fires

Select a place to build a fire so that it will not spread or endanger any woods or grasslands. If the weather is dry, dig up a circular area around the spot selected for your fire. Do not build the fire on dry leaves, dry grass or dry peat.

Obtain dry twigs and dead limbs. Set the twigs up tepee-like over tinder paper, dry leaves, pine needles or shavings. Ignite the tinder and wait until the blaze is well started before adding larger and harder wood.

For fuel, use dry standing dead wood and dry dead branches. Dead wood is easy to split and break - pound it on a rock. In treeless areas, you can find natural fuels such as dry grass which you can twist into bunches.

When a sufficient quantity of fuel is obtained, start the kindling and gradually add the larger fuel.

Save matches by using a candle, if you have one or use a shave stick or small faggot of thin dry twigs, tied loosely. If matches or a lighter are not available prepare very dry powdered wood, finely shredded dry-bark, lint from cloth, twine or fuzzy material scraped from plants; fine bird feathers or nests. These may be ignited by striking a piece of flint on steel, the use of burning glass (the convex lens on a flashlight) or by friction.

Cooking of Meat and Fish

Boiling -

This is the best method of preparing meat for human consumption. It is easy and it requires less fuel than other methods. If you drink the resultant broth as well, you get the full food value. A small quantity will feed a number of people and there will be no waste. In order to ensure that all meat is properly done, have the chunks of equal size.



A simple method of suspending the pot over the fire.

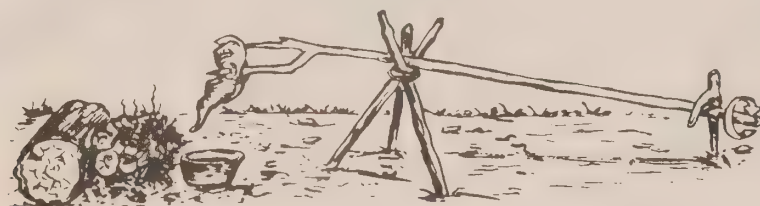
Frying and Boiling -

These can be done if utensils are available and if there is sufficient food available. A certain amount of the food value is wasted, and above the tree line, where you may have only a limited quantity of fuel, you may waste it.

Barbecuing or Roasting -

This is an easy method and often produces the tastiest results, though it causes the most waste. Clean the fish or small animal and spike it on the end of a green stick elevated beside a hot fire which produces as little smoke and flame as possible. If necessary turn the meat occasionally to assure it is thoroughly cooked. A great quantity of nutritious juice is lost by this method and there is considerable shrinkage.

However, this can be partially counteracted by either placing the meat very close to the fire at first to form a hard crust on the outside which will contain the juices, or having the meat suspended at one end of the fire with a shallow plate underneath to catch the drippings.



Use a weight on the butt of the pole if necessary. The pole can be rotated to baste all sides of the meat.

Broiling and Barbecuing or Roasting

Meat should be held to the side of hot coals not over them. Avoid smoke and flame. Use a receptacle to catch drippings.



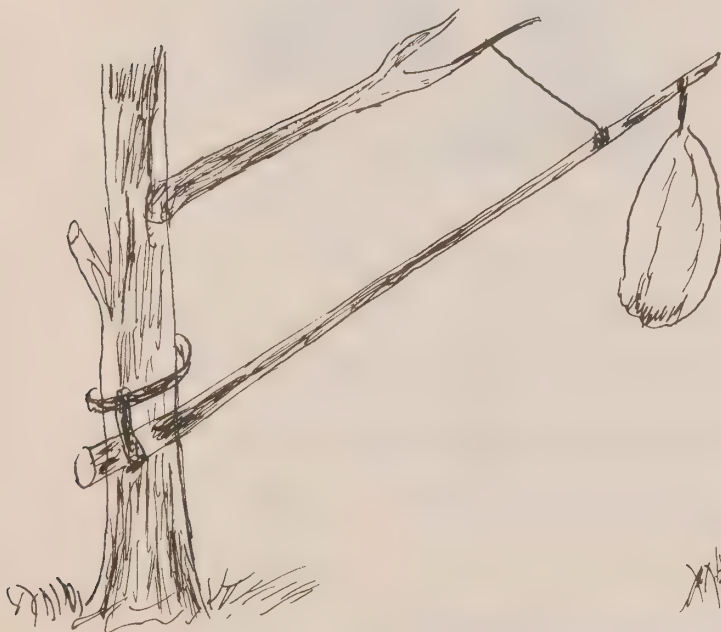
Plank fish or meat on a split log with pegs.

Protection of Food from Animals

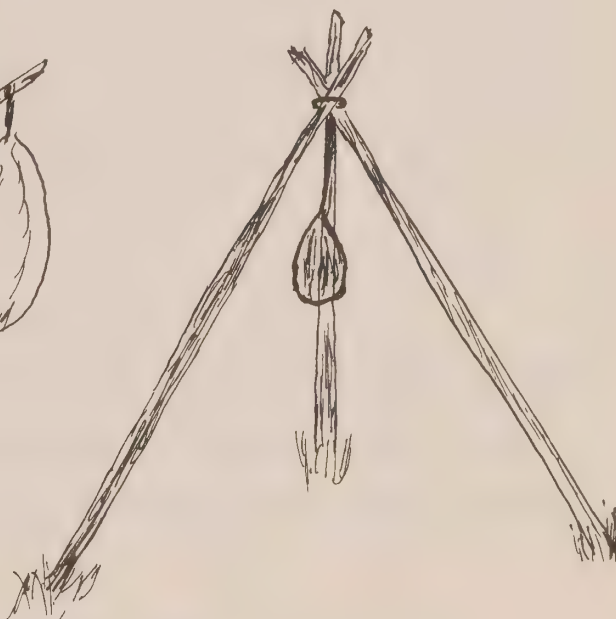
Surplus food and supplies should be cached. There are numerous methods of doing this. The best is to suspend the meat by rope, away from trees or uprights.

The main threat to your cache is animals, from the bear to the mouse. The cache should be high enough to prevent attack from the ground, ten to fifteen feet, and far enough out from the uprights that climbing and springing animals will have difficulty reaching it. Squirrels and Canada Jays are the nuisances. Food can be covered to ward off the meat-hungry birds, but from the preservation point of view, it is advisable to have the cover fit loosely so that air can circulate around it. The following are illustrations of caching food:

One pole cache



The pole or Tripod Cache



SIGNALS

If you are lost or are involved in an air crash it is very useful to know the following signalling procedure.

SMOKE AND LIGHT

1. Smoke and Fire -

These are natural signals, easy to use and very useful. Smoke is excellent on clear fairly calm days but works anytime. Fire and smoke will provide 24-hour service



Signal Fires

Method

- (a) In accordance with the diagram, make three signal fires at least 100 feet apart if possible, and grouped in a triangle. Three fires, or signals in groups of three, are international distress calls.
- (b) Along a creek bank or ravine, three fires in a line work.
- (c) Build signal fires in an open area, a field, marshy ground, or on rafts out on a lake or pond, if possible, and close to your

shelter so a quick dash can be made to light them when an aircraft is heard.

- (d) Have fires protected from rain and all ready to light with dry feather sticks and splintered kindling in the centre. Place larger sticks around the kindling in tepee fashion and thatch with green boughs or moss. Keep additional fuel, green boughs, moss and grass handy as emergency insurance.
- (e) If you are near a crashed aircraft, rubber and oil from it make a good black smoke.
- (f) Smoke signal fires can be lit once a day to attract any local people in the area - forest ranger, campers and rescuers, who may see your smoke during the day or fires at night and investigate.
- (g) Continuous burning is unnecessary and wasteful on wood and energy.
- (h) Always be careful with fire and ensure that precautions are taken against your fires spreading.

2. Light Signals -

Any form of light can be used. Camp fires, flashlights, candles or dry grass may provide a means of being detected from the air at night. A good trick is to employ a light inside a tepee or tent which lights up like a giant Japanese lantern.

3. Torch Tree

- (a) Select an evergreen tree with thick foliage, one that is isolated from other trees to minimize the risk of forest fire.
- (b) In winter, shake the tree or hammer the base and remove as much

snow and ice as possible.

- (c) Build a "bird's nest" in the lower branches of the tree using branches of other trees with dry kindling and bark mixed with them.
- (d) Around the base of the tree prepare a bonfire - using feather sticks, dry splintered wood, bark, and any combustible material (like gas and oil from the aircraft if available).
- (e) This bonfire will burn and ignite the "bird's nest" which helps fire up the whole tree making it a gigantic torch - visible to aircraft and anyone for many miles around.
- (f) Prepare this signal in advance and use precautions against getting the kindling wet or spreading fires.

4. Flash Fires

If gas and oil are available, use only when the aircraft is sighted. Pour the fuel on the ground or saturate pieces of fabric and light them when needed. Take fire precautions.

5. Heliograph Mirror.

A very useful, important and easy to carry piece of equipment, this device has probably been responsible for effecting more rescues than other methods. It is simply a mirror with a hole in the centre so that the reflected light can be aimed accurately at the searchers. It is in nearly all types of survival kits. Follow the instructions on the back of the mirror. It can be seen many miles away on a clear sunny day. If you have no mirror, improvise with a piece of polished metal. The side of a ration can make a good usable mirror.

Carefully cut a cross about 1 inch long in the centre of the sheet with the point of your knife while the metal is lying on a flat surface. At night a flash-light or candle light directed at the heliograph mirror may be effective.

6. Aircraft Landing Lights

Use these if they are still serviceable.

Aircraft Parts - The aircraft itself, is an excellent signal. Cut down nearby trees and shrubs that may conceal it from the air. Keep it clear of snow. Shiny pieces of metal from the aircraft laid on the ground will reflect the sun.

7. Shadow

Shadow signals are quite effective when built in a clearing and of sufficient size and contrast. In Canada a cross with arms running NE SW and NW SE will catch maximum sun shadow.

Construction

(a) Arctic Winter - snow block wall - line the blocks along the trench from which the snow blocks were cut.

(b) Arctic Summer - sod, stones, sand, or driftwood walls.

(c) Bush Winter - tramped in the snow; lay green bough signals in the snow; or better still stick them in snow and build a wall of brush and boughs around them.

(d) Bush Summer - rock pile signals - bush or logs for letters.

Use fresh peeled logs and bark or sod blocks.

8. INFORMATIVE SIGNALS

If you are in an aircraft which makes a forced landing -

Leave a written note for a search party if you leave the crash scene or last camp site and are on the move. Write pertinent facts: date, direction travelling, number and condition of the party. Leave the message in a bottle or can, if possible, and suspended from a tree or trip or under a rock cairn. A sign visible from the air should be laid out also to give the direction of travel. For yourself and searcher, blaze a trail.

NOTE: Check travel notes for blazing trails and leaving messages.

CONCLUSION

Establishing contact with or attracting the attention of searchers and rescuers should be your main objective as soon as your vital survival needs have been taken care of.

- (a) Have your signals all ready and show them effectively.
- (b) Prepare as many types of signals as you can at the best possible sites.
- (c) Protect signals and equipment from moisture and cold.
- (d) Remember that any unusual sign or colour contrast is visible from the air, even a single trail in the snow.
- (e) Use guns sparingly and with caution.
- (f) Smoke and a mirror are your best signals when no radio is available.
- (g) Care for your signalling equipment - learn to use it and be found.

GROUND TO AIR SIGNALS

Use strips of fabric, parachutes, peeled logs, stones, sod, branches in snow. Try to provide maximum contrast. All figures should be at least 40 feet long.

KEYCODE

1. Require Doctor, Serious Injuries	—
2. Require Medical Supplies	==
3. Unable to Proceed	X
4. Require Food and Water	⌋
5. Require Firearms and Ammunition	»»
6. Require Map and Compass	□
7. Require Signal Lamp with Battery, and Radio . .	— —
8. Indicate Direction to Proceed	K
9. Am Proceeding in this Direction	➔
10. Will Attempt Take-Off	I >
11. Aircraft Seriously Damaged	⌋
12. Probably Safe to Land Here	Δ

13. Require Fuel and Oil	L
14. All Well	LL
15. No	N
16. Yes	Y
17. Not Understood	JL
18. Require Engineer	W

CARE AND USE OF EQUIPMENT AND CLOTHING

In the battle of man against nature, the odds greatly favor the person who is able to utilize available equipment to the full and knows how to care for it.

It has been found that some persons have failed to survive, even under reasonably good conditions, not from lack of equipment but from failure to care for it and use it to the best advantage. Here are some suggestions for the proper care and use of the various pieces of equipment found in survival kits usually carried on the trail, together with some suggestions for the fabrication of further survival aid.

Axe

This is one of the most important pieces of survival equipment, and also one of the most abused. Properly used it can simplify your survival problem, but misused, it can become a means of crippling yourself to such an extent that survival becomes impossible.

If your axe does not have a sheath, make one from any suitable material available, and keep the axe in its sheath until it is required for use. Before using, make the following checks.

- (a) Check the head for tightness of the handle. If it is loose, either drive the wedge further home or make a new wedge using hardwood. Soaking the head is another method but it is not recommended for winter time, as ice may form on the handle and inside the head, allowing the head to slide off and cause possible injury. To drive the handle further into the head, strike the end of the handle, not the head of the axe.

- (b) Check for sharpness. A dull axe can be dangerous for two reasons.

First it will not bite properly and will tend to glance off the wood being cut. Secondly, when blunt it is necessary to use more force, which usually means a sacrifice of control.

- (c) Check that the handle is not cracked or split. A serious cut or splinter might be received.

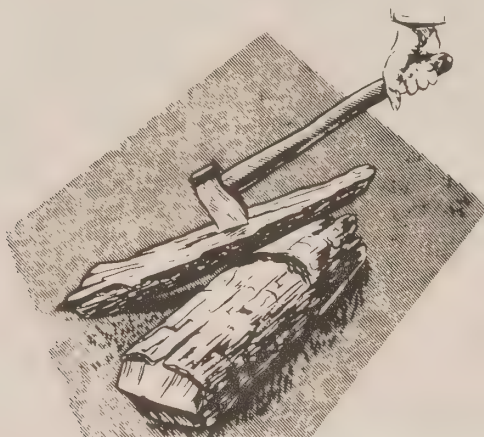
When carrying an axe, be sure that the sharp edge is held away from the body. In the event of a fall, there will then be less chance of injury.

When felling a tree, these procedures should be followed:

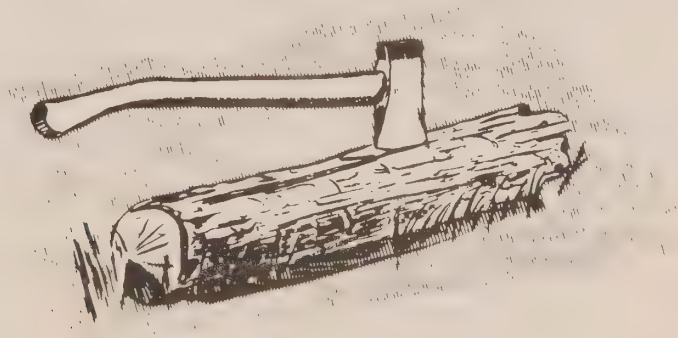
- (a) Before beginning, clear the tree of lower limbs, and remove the underbrush from around the bottom of the tree. This is to ensure that the axe is not deflected during the swing.
- (b) Check your distance from the tree to avoid underreaching or overreaching. Overreaching can result in breaking the axe handle; underreaching in a cut foot.
- (c) Take up a comfortable stance, making sure that both feet are firmly set.
- (d) The first cut should be made on the side of the tree facing the direction of the desired fall, often decided by the "lean" of the tree. This cut should be not more than half-way through the tree. The back cut should be commenced slightly above and opposite the first cut.
- (e) It is safest to cut the tree off not over a foot above the ground.

Always keep the axe handle low, i.e., parallel to the ground where the blade strikes the cut. When using short handled axes or hand axes bend carefully at the hips or kneel on one knee.

When splitting wood, do not lay the piece to be split on the ground, but support it as illustrated. This not only prevents the axe from chopping into the ground and becoming blunted, but may also prevent injury to legs or feet.



When finished with the axe, clean the head carefully, replace the sheath, and store in an upright position. It is permissible to store by sticking it in a dry stump, but green wood should never be used for this purpose.



Always stick your axe
in a log or stump

Knife

As with the axe, the knife should be kept sharp and carried in a stout sheath. Return it to the sheath immediately after use. Always position the sheath on your belt towards the back of the hip, since with the knife in a forward position it is possible that a fall could drive the knife into the groin. Guard against loss by attaching a cord from the handle of the knife to your belt or belt loop. Never throw your knife. It is ineffective when so misused and it will probably be damaged or lost.

Firearms

Rules for the proper care of your firearms are as follows:

- (a) In cold weather, store your firearms in a sheltered cold spot. Avoid moving between the warm shelter and cold outdoors as eventually, because of the condensation of moisture on the metal parts, the protective blueing will break down and allow the metal to rust. Also remove grease and oil from the weapon and replace them with non-freezing oil or graphite. If neither is available, the moving parts can be rubbed with a pencil or the gun can be used without lubrication.
- (b) Keep the barrel clean at all times. A plugged barrel may cause a firearm to explode, with serious injury to the user.
- (c) Always prove your weapon when storing it or picking it up. "Empty" guns have caused many fatalities.
- (d) Store guns and ammunition in a safe dry place.

Snow Saw-knife

In the Arctic, the snow saw-knife is one of the most useful tools in your

possession. Guard against loss by sticking it upright in the snow when not in use. At night take it into the shelter with you, because it may be necessary to cut your way out in the morning. Avoid chopping ice or frozen meat with it; under extremely cold conditions this can chip or shatter the blade.

Ice Chisel

As with all edged tools, it should be kept sharp. When using the ice chisel make a cord loop, attach it to the end of the handle and loop it over your wrist. This will guard against loss when the chisel breaks through the ice.

Sleeping Bag or Bedding

In summer, keep it dry, air it when weather conditions permit, and shake it daily. Roll up lightly when not in use.

In winter, keep it free of snow. Open it completely every morning and gently beat off any frost which may have formed during the night. Roll the bag or bedding up lightly and cover it to protect it from the snow when not in use. Air your bedding as often as weather will permit and shake the sleeping bag gently to restore resiliency to the feathers. If using wood fires for heat, guard against spark damage. If a hole should occur in your bag, repair it immediately, possibly by using part of a skin. Considerable loss of insulation could result if a hole is not repaired when first noticed.

Clothing

It is even more important to keep your clothing clean and in good repair while travelling or on survival than it is during your everyday life in the

settlement. Good hygiene is of course essential and the clothes on your back will probably be the only ones you have until you return or are picked up.

Use your clothing wisely, making every effort to keep it clean and dry at all times. If your clothes become wet, dry them as soon as possible. Socks and mitts particularly should be kept dry. These will usually get damp during a day's wearing. Unless too damp they can be dried quite effectively by placing them in your sleeping bag before retiring and leaving them there for the night. If a hole is worn in a sock, turn the sock over to prevent a blister on the heel.

In winter it is best to dress lightly when exerting yourself, and have extra clothing handy to put on when sitting around idle.

When working in a parka, it is wise to drop the hood and allow the warm air around your body to escape. The hood can be raised again when work is completed.

In the Arctic, damp clothing can be left to freeze and the moisture beaten out of it when frozen.

In the bush, clothing may be dried by the fire. Take the following precautions:

- (a) Never place clothing nearer to the fire than you can comfortably hold your hand.
- (b) Never leave clothing by an untended fire.
- (c) When drying leather foot-wear, turn it and work the leather periodically to keep it pliable. When almost completely dry, apply a good coating of

dubbin or fat, working the grease well into the seams and pores of the leather. Do not heat mukluks or leather.

Miscellaneous Equipment

Your camp will contain many small items which can easily become lost if not looked after. The following rules apply to such pieces of gear which are not usually carried on the person but are used by everyone in the party.

- (a) Have a designated place for the equipment, and return it after use. Have this location well marked, and make everyone in the party aware of its existence.
- (b) Never lay equipment down on snow, spruce boughs, or ground. Put it in your pocket or hang it in a conspicuous place.
- (c) Place your equipment in an accessible place, so that you can reach such items as your signal flares at a moment's notice.
- (d) Small items, such as the compass and match container, should be tied to the person to avoid loss while travelling.

Other General Rules

Do not cut rope or twine unless absolutely necessary, as you may need it later in its original length.

Make sure your cooking is done on level solid ground to guard against tipping. Fill your primus stove, lantern, etc., away from your shelter, and over some utensil that will catch spills, thus reducing waste and eliminating the fire hazard.

Make a habit of tying knots which can easily be undone, such as the bowline, clove hitch, (see section on Knots) particularly in cold weather.

Do not throw away scraps of cloth, bits of twine, metal, and so on. You may find a use for them later.

Keep your cooking and eating utensils clean. Any abrasive material, such as sand or wood ash or a combination of both, makes a good substitute for soap. During the arctic spring (April to June) and in winter bush snow conditions, sun-glasses, improvised or otherwise, should be used continuously. As long as the sun is up, especially on slightly overcast days, there is a danger of snow blindness. If your glasses become steamed up while working, do not discard them but try to provide more ventilation. Snow blindness can be serious.

Improvised Equipment

The following improvization of useful equipment have been developed in the past:

- (a) Needles from bone or metal parts;
- (b) Fish lures from various combinations of wood, metal and brightly coloured cloth;
- (c) Snow knives from wood, metal or bone;
- (d) Water bottles from bark, the internal organs and skins of animals;
- (e) Good whisk broom from wings of birds;
- (f) Eating utensils from bone, wood or metal;
- (g) Eye snow shields from wood or from cloth.
- (h) The Bow drill principle can be used for drilling holes in objects.
- (i) A parachute may be used for covering a pole shelter, ground sheets, and the cords used for lacing.

General References

<u>Down But Not Out</u>	Queen's Printer, Ottawa, Canada	\$3.00
<u>Guides Manual</u>	Ontario Department of Lands and Forests, Parliament Buildings, Toronto, Ontario.	
<u>Your Emergency Survival Kit</u>	Civil Defence Department, Milwaukee, Wisconsin, U.S.A.	
<u>So You Want To Go Camping</u>	Ontario Department of Lands and Forests, Parliament Buildings, Toronto, Ontario.	
<u>Survival Hints For The Sportsman</u>	R.C.A.F. Air Transport Command, Trenton, Ontario.	
<u>Survival in the Woods</u>	Ontario Department of Lands and Forests, Parliament Buildings, Toronto, Ontario.	
<u>Search-Rescue-Survival</u>	The R.C.A.F. Rescue Coordination Centre, Winnipeg, Manitoba.	

